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ARD RED SPRING WHEAT

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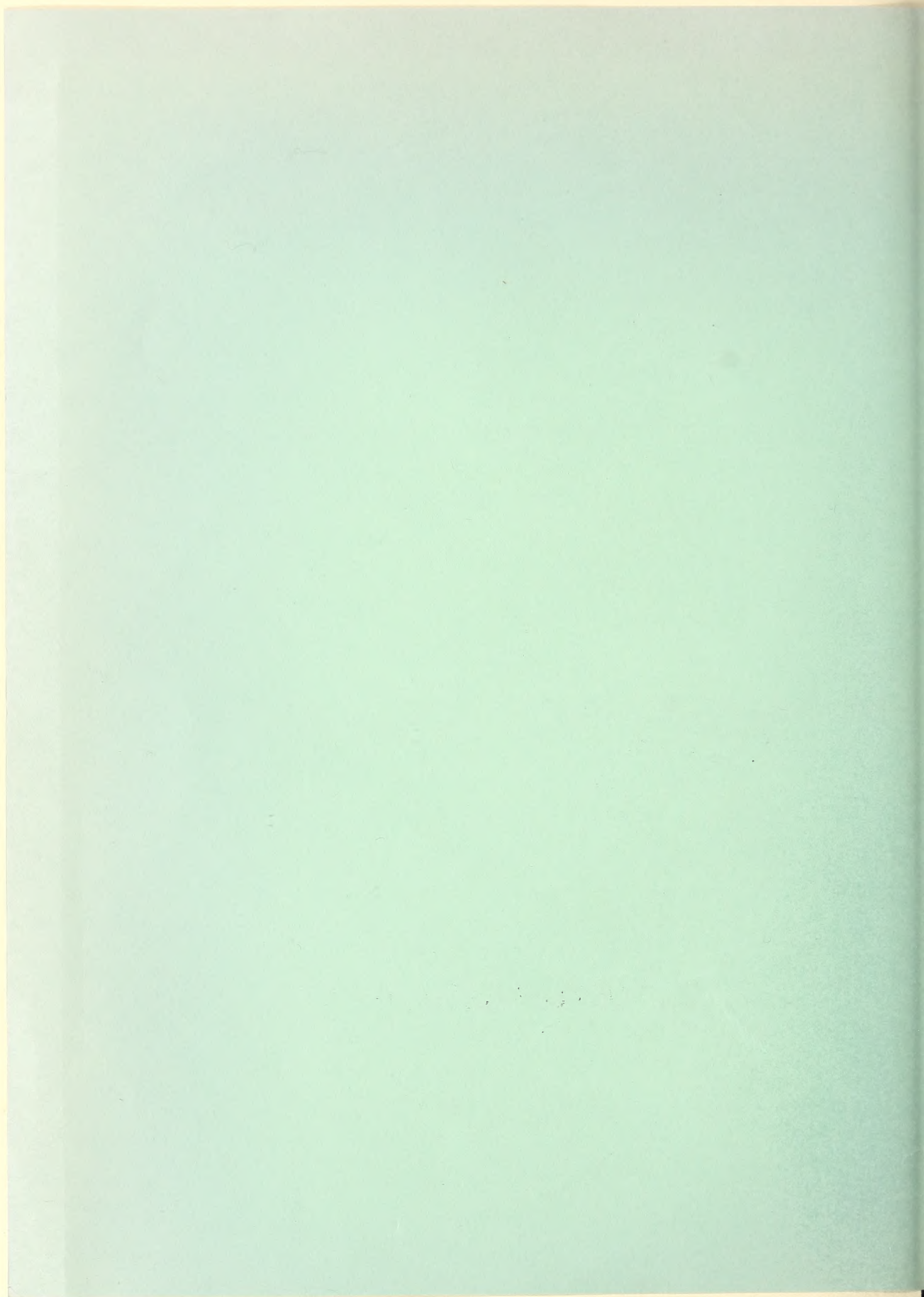


QUALITY REPORT

Physical, Chemical, Milling, and Baking Characteristics

1963 CROP

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
CROPS RESEARCH DIVISION



UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Crops Research Division

Preliminary Report Not For Publication 1/

PHYSICAL, CHEMICAL, MILLING, AND BAKING EXPERIMENTS WITH HARD RED SPRING WHEAT

1963 CROP 2/

by

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1/ This is a progress report of cooperative investigations containing data, the interpretation of which may be modified with additional experimentation. Therefore, publication, display, or distribution of any data or any statements herein should not be made without prior written approval of the Crops Research Division, Agricultural Research Service, United States Department of Agriculture and the cooperating agency or agencies concerned.

2/ Investigations of the Crops Research Division, Agricultural Research Service, The samples were obtained from the cooperative experiments with the State Agricultural Experiment Stations in the spring wheat region.

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COOPERATING AGENCIES, STATIONS, AND PERSONNEL

The cooperating agencies and stations conducting the varietal plot and nursery experiments from which these 1963 spring wheat samples were received were as follows:

Colorado Agricultural Experiment Station

Fort Collins.

Minnesota Agricultural Experiment Station

Crookston, Morris, Rosemount, St. Paul, and Waseca.

Montana Agricultural Experiment Station

Bozeman, Cutbank, Havre, and Sidney.

North Dakota Agricultural Experiment Station

Casselton, Fargo, Langdon, and Williston.

South Dakota Agricultural Experiment Station

Brookings, Eureka, Highmore, and Watertown.

Wisconsin Agricultural Experiment Station

Madison.

A complete list of all cooperating agencies, stations, and personnel for the year will be found in the report by Dr. E. R. Ausemus, "Results on Spring Wheat Varieties Grown in Cooperative Plot and Nursery Experiments in the Spring Wheat Region in 1963." Pages 3 - 5, CR-7-64.

COOPERATING AGENCIES, STATIONS, AND PERSONNEL

The cooperating agencies and stations conducting the various plant and variety experiments from which these 1953 spring wheat samples were received were as follows:

Colorado Agricultural Experiment Station

Fort Collins

Minnesota Agricultural Experiment Station

Crookston, Morris, Roseau, St. Paul, and Wadena

Montana Agricultural Experiment Station

Bozeman, Chubbuck, Havre, and Sidney

North Dakota Agricultural Experiment Station

Casselton, Fargo, Langdon, and Minniston

South Dakota Agricultural Experiment Station

Brookings, Huron, Rapid City, and Watertown

Wisconsin Agricultural Experiment Station

Madison

A complete list of all cooperating agencies, stations, and personnel for the year will be found in the report by Dr. E. H. Anderson, "Results on Spring Wheat Varieties Grown in Cooperative Plant and Variety Experiments in the Spring Wheat Region in 1953," Pages 3 - 5, CR-53-1.

INTRODUCTION

Samples of standard varieties and many of the new strains of hard red spring wheat grown in cooperative experiments in the spring wheat region of the United States ^{3/} have been milled each year by the USDA. The flours were assayed chemically and physically and baked into bread to determine the quality characteristics. The purpose of this report is to make available to the cooperators, quality data on the standard varieties and new strains of hard red spring wheat from the 1963 crop.

The same general format and techniques were used in evaluating the wheats as given in the 1962 quality report. The data contained in this report are comparable to the data of the 1962 report. Certain tables containing average results also contain the average results for the 1962 crop so that comparisons of the two crop years can be made.

The new format adopted for the 1962 crop report is also used in this report. Under the three categories of kernel characteristics, milling performance, and baking evaluation, only the deficiencies which may be apparent for the varieties, or outstanding characteristics, are given for sake of brevity. It is hoped that with the use of this format one can quickly ascertain the various characteristics of the sample and any outstanding features or deficiencies which are apparent. Again, for physical characteristics, the mixogram data are given with no specific comments made regarding the patterns, since reference mixograms for each of the general types are presented at the end of the report.

The oxidation requirements for the 1963 crop were generally the same as the 1962 crop, requiring 1 p.p.m. bromate. However, the Eureka and Brookings observation nursery samples required 2 p.p.m. of bromate. There was a tendency for the 1963 crop to require slightly more bromate than the 1962 crop for some stations, but 1 p.p.m. gave satisfactory results.

^{3/} Ausemus, E. R., Results on Spring Wheat Varieties grown in Cooperative Plot and Nursery Experiments in the Spring Wheat Region in 1963. USDA, Agricultural Research Service, Crops Research Division. CR-7-64.

INTRODUCTION

Samples of standard varieties and many of the new strains of hard red spring wheat grown in cooperative experiments for the spring wheat region of the United States have been milled each year by the USDA. The flour were assayed chemically and physically and baked into standard quality characteristics. The purpose of this report is to make available to the cooperators, quality data on the standard varieties and new strains of hard red spring wheat from the 1953 crop.

The same general format and techniques were used in releasing the wheat as given in the 1952 quality report. The data contained in this report are comparable to the data of the 1952 report. Certain tables containing average results also contain the average results for the 1952 crop so that comparisons of the two crops can be made.

The new format adopted for the 1953 crop report is being used in this report. Under the three categories of kernel characteristics, milling performance, and baking evaluation, only the determinations which are important for the varieties, or outstanding characteristics, are given for each variety. It is hoped that with the use of this report you can quickly ascertain the various characteristics of the sample and any outstanding features or determinations which are important. Again, for physical characteristics, the miller's data are given with no specific comments regarding the patterns, since reference is made for each of the general types are presented at the end of the report.

The evaluation requirements for the 1953 crop were generally the same as the 1952 crop, regarding 1 p.m. moisture, however, the 1953 and 1952 crops were evaluated differently. The 1953 crop was evaluated for a tendency for the 1953 crop to require slightly more moisture than the 1952 crop for some stations, but 1 p.m. was satisfactory results.

SOURCE OF THE SAMPLES

Tests were performed on 742 samples received from field plots, uniform regional nursery, advanced nursery, observation nursery, sawfly nursery, and special studies. These samples originated in six states: Colorado, Minnesota, Montana, North Dakota, South Dakota, and Wisconsin. Eighteen stations from these states were represented, namely, Fort Collins in Colorado; Crookston, Morris, St. Paul, Rosemount, and Waseca in Minnesota; Cutbank, Bozeman, Havre, and Sidney in Montana; Casselton, Langdon, and Williston in North Dakota; Brookings, Eureka, Highmore, and Watertown in South Dakota; and Madison in Wisconsin.

A limited number of samples were blended this year. Only those samples which had characteristics which were compatible were blended, and from adjacent areas. One set of samples, the sawfly series, from Cutbank and Sidney, Montana were blended prior to being shipped to the laboratory. A series of observation samples from Highmore and Watertown, South Dakota were blended. The uniform regional nursery samples blended were the Morris and St. Paul samples, the Casselton and Crookston samples, and the Brookings and Watertown samples. Care was taken in choosing the samples for blending such that no extreme differences were apparent in the characteristics of the wheats, and protein contents were comparable. The samples blended were carefully selected to eliminate the effect blending could have when extreme differences exist between samples which would give erroneous results. Some additional blending could have been done if the samples had all been received at the same time. However, there were some samples which were received quite late and the mates to these samples had already been processed.

On page 5 are listed the spring wheats which were included in the uniform regional nursery 1963 trials. The variety or cross, the station which developed the variety, the state selection number and the C.I. number are given.

Variety or Cross	Included by	Station Developing	State or Sel.No.	C.I.No.
Crim	Minnesota	St. Paul	II-53-404	13465
Justin	North Dakota	Fargo	ND 102	13462
Lee	"	"	"	12488
Marquis	"	"	"	3641
Pembina	Canada	Winnipeg	CT-229	13332
Selkirk	"	"	"	13100
Thatcher	"	"	"	10003
RL 2520 x Tc ⁶ -KF	"	"	RL 4133	13776
RL 250 x Tc ⁶ -KF	"	"	RL 4137	13777
RL 4125 x Tc ⁶ -Sn ⁶	"	"	RL 4159	13775
ND 140 x ND 138	North Dakota	Fargo	ND 229-1	13589
ND 140 x ND 138	"	"	ND 247	13568
ND 81 sib x Conley	"	"	ND 256	13608
ND 138-Lee x FPI 186035	"	"	ND 264	13569
Conley x ND 142	"	"	ND 271	13571
ND 137 x ND 138	"	"	ND 287	13590
ND 40-2-1-76 x Conley	"	"	ND 345	13653
ND 140 x ND 138	"	"	ND 404	13778
Conley-Lee x FPI 186035	"	"	ND 405	13779
Conley x ND 122	"	"	ND 406	13780
Ftn x Tc ⁴	Minnesota	St. Paul	II-52-238	13572
Ftn - Tc ³ x II-44-29-Tc ²	"	"	II-53-521	13657
Ftn - Tc ³ x II-44-29-Tc ²	"	"	II-53-525-1	13751
II-50-17 x Rmr	"	"	II-54-29	13654
II-50-17 x Rmr	"	"	II-54-30	13655
M 2824 ² x II-50-72	"	"	II-55-11	13773
M 2824 ² x II-50-72	"	"	II-55-12	13774
Kenya 338 x Lee	Montana	Bozeman	B 61-88	13772
II-50-17 x Pilot	"	"	B 61-95	13586
Kenya 184 x Wisc. 250 ⁴	Wisconsin	Madison	6-16-2	13588

METHODS

Briefly, the following methods and terminologies were applied:

Test Weight Per Bushel - The weight per Winchester bushel of cleaned, dry, scoured wheat. To determine the dockage-free test weight on a comparable sample, approximately one pound per bushel should be subtracted from the value given.

1000 Kernel Weight - The 1000 kernel weight was determined by counting the number of kernels in a 10 gram sample of cleaned, picked wheat with an ASCO seed counter 4/.

Kernel Size - The percentages of the size of the kernels (large, medium, and small) was determined on a wheat sizer as described by Shuey 5/.

The sieves of the sizer were clothed as follows:

Top Sieve - Tyler #7 with 2.92 mm. opening,
Middle Sieve - Tyler #9 with 2.34 mm. opening,
Bottom Sieve - Tyler #12 with 1.65 mm. opening.

Potential Yield - The potential yield was determined by multiplying the percentages of the overs of each sieve #7, #9, and #12, by the value of 78%, 73%, and 68% respectively. The accumulation percentage is given as the potential yield.

Milling - The samples were cleaned by passing the wheat over an Emerson Kicker and Dockage Tester and through a modified Forster Scourer Model 6 4/. The clean dry samples were tempered to 16% moisture and allowed to stand overnight prior to milling.

All samples except the field plot and sawfly nursery samples were milled on a Brabender Quadromat Junior Mill 4/. The mill was equipped with a #18 wire on the drum sieve. The throughs of the #18 wire were rebolted on a Strand sifter equipped with a #60 Tyler sieve. The sample was sifted for 1 minute. The throughs of the #60 wire were classified as flour and this was the material tested.

The field plot samples were milled on a Buhler Continuous Experimental Mill. This mill has been slightly modified to give results more comparable to commercial milling. The break scalping sieves were clothed with #54 stainless steel wire the reduction scalping sieves with #58, #66, and #105 stainless steel wires for the first, second and third reduction, respectively. All of the flour sieves were clothed with #135 stainless steel wire.

4/ Mention of a trade product, equipment or a commercial company in this publication does not imply its endorsement by the United States Department of Agriculture over similar products or companies not named.

5/ Shuey, William C. A wheat sizing technique for predicting flour milling yield. Cereal Science Today 5:71-72, 75. 1960.

All 6 flour streams were combined to give the patent flour. The extraction of a good milling wheat using this flow is approximately 68%. This is comparable to a commercial "long patent" extraction flour. At this flour extraction of the wheat, the changes in flour ash are most sensitive to changes in percent extraction.

Protein Content - The protein was calculated by multiplying the factor of 5.7 times the percent nitrogen as determined by the standard Kjeldahl procedure.

Mineral Content or Ash Content - This was determined by measuring the residue of the minerals left after incinerating the sample for approximately 16 hours at 565° C. The results were reported as percentage of the sample which was incinerated.

Mixogram - The mixogram was determined by using 30 g. of flour and adding 20 cc. of water. The sensitivity spring setting was set at 10. All mixograms were run with constant weight of flour and volume of water. Absorptions reported were adjusted according to the height of the mixogram. The correction factor was determined from a series of flours by varying the amount of absorption.

Mixogram Pattern - The mixogram patterns as given at the end of the report demonstrate the different types of mixograms which were obtained. A single number was assigned to each pattern with the larger number indicating stronger curve characteristics.

Baking Procedure or Formula - The baking formula used was as follows:

100% flour	3% milk D.S.M.
2% salt	3% yeast
5% sugar	2% shortening (Crisco, melted)

The sample was mixed to development in a National Manufacturing mixer, for the 25 g. sample the Micro mixer, for the 100 g. sample the 100 g. special mixer size.

Absorption - This was the water, expressed as percent of the flour, required to bring the dough to proper consistency.

Crumb Color - This value was determined by comparing the loaf of the tested sample against a baking standard. This standard was selected as an average for the crop year for the spring wheat area.

Loaf Volume - This was volume of the baked loaf as determined by seed displacement.

All values (Protein, Ash, and Absorption) were reported on a 14% moisture basis.

DISCUSSION

The following discussion presents some of the bases for the techniques and criteria used in evaluating the samples. There are four major evaluation categories used: kernel characteristics, to characterize the kernel; milling performance, to evaluate the general milling characteristics; mixogram patterns, to classify the flour as to type; and baking evaluation, to rate the flour as to overall baking.

Each evaluation category can be important. A sample could be of a sufficiently poor quality for a given category to eliminate it from possible future testing. However, a sample submitted for the first time and found to be questionable should be tested again to establish if it has a desirable or undesirable classification. A sample which is consistently rated as questionable should be discarded.

All samples are compared and graded according to a milling and baking standard which is a Selkirk variety blended to a known quality. The quality of this standard is considered minimal for baking strength. The ratings are based on an overall area evaluation for the spring wheat producing area. Therefore, certain areas may have all samples, even the named varieties, which will be classified as questionable to undesirable, when normally they may exhibit satisfactory strength in another area. It is necessary to grade on this basis so that directly comparable results of the overall spring wheat producing area can be observed. The quality of the various varieties and the relative strength of the crops grown in different sections of the spring wheat area can thus be compared.

An area may produce low protein wheats which give large and plump kernels, good milling, and kernel characteristics, but low protein, and unsatisfactory baking properties such as short mixing time, low loaf volume, and weak dough characteristics. The wheat from this area could not be considered as a strong spring wheat and would not maintain the quality of the spring wheat producing area. A good variety should have tolerance to a wide range of environmental conditions and the overall picture taken into consideration for establishing these varieties.

A sample rated as satisfactory to questionable has only a very minor fault, however, if it is questionable to satisfactory, the fault is more serious, but in either case the fault is not sufficient to be considered as detrimental. For questionable to unsatisfactory, and unsatisfactory to questionable, the faults are much more serious and the sample would have little future promise of being accepted if such faults were consistent.

When more than one of the factors are below the standard, the variety is marked as questionable or undesirable. If sufficient data accumulated over a two or three year period show a definite deficiency, the variety should be discarded. If a major fault is found, the variety is undesirable and should be discarded.

Kernel Characteristics are important in determining the initial value of the wheat and, if extremely poor could disqualify a new variety from further consideration. Because of the present grading system, it is desirable to have a good test weight. If a sample has a low 1000 kernel weight and small kernel size distribution, it would be considered a poor sample for milling because of the high ratio of bran to endosperm. Therefore, it is desirable to have plump kernels. Wheat ash is an important factor when comparing a variety against other standard varieties. If a sample would have consistently higher wheat mineral content, it would enhance the probability of having high flour ash. Low protein would not be desirable when comparing with standard varieties, because in a low protein crop year the probability of it having such a low protein as to be undesirable is very probable. Therefore, the protein must also be considered as a characteristic when comparing other varieties grown at the same locality.

Milling Performance is very important, especially the sub-category of milling characteristics. If low extractions or high flour ash are obtained, this becomes a major factor and is quite unacceptable from a commercial milling standpoint. All flour mineral contents are reported at a constant extraction of 65% so that the figures are directly comparable. As a rule of thumb, one can approximate that each point of ash (0.01%) is equivalent to approximately 2% in extraction.

Milling characteristics are important. A sample which tends to be soft in character requires a different milling technique to be milled properly. On commercial mills flowed for hard vitreous spring wheats, soft milling characteristics cause great difficulty. Therefore, if a sample shows softness in character, it is considered to be undesirable. Likewise, a sample which is extremely hard and vitreous will cause difficulty. Both types of wheat (soft or vitreous) require different roll pressures, clothing, sifter surface, and temper to be milled properly. If these wheats are blended with normal milling wheats, improper results are obtained, since these characteristics are not necessarily compatible or additive. Normal to soft score indicates that the sample shows a tendency toward softness of character on the flour mill stocks and extraction. This would indicate that the sample may give some difficulty for certain mill streams and an adjustment would either have to be made in the milling flow, or in tempering procedures to compensate for these differences. The properties of this wheat may or may not be compatible with other wheats with which it may be blended, therefore, it is important to maintain varieties with as uniform milling characteristics as possible.

The amount of protein recovered in the flour for a sample is of importance. The high protein wheats yielding low protein flours are not desirable. Such a wheat would have much of the protein distributed in the outer portion of the kernel which would result in excessive protein in the feed. Therefore, higher protein in the wheat would be necessary to yield a flour of comparable protein to a wheat which gives good flour protein recovery.

Mixogram Patterns or Farinogram Patterns are important in estimating the strength and mixing tolerance or potential mixing tolerance of a flour. A long flat curve is more desirable than a short peaked curve; however, an extremely long curve may be undesirable, since the flour would require excessive mixing to develop. The pattern of the curve is of importance as well as the length, and must be considered.

Baking Evaluation - Takes into account the flour absorption, mixing time, dough strength, loaf volume, and machinability. A sample which has low absorption would be unsatisfactory, compared to other spring wheats with normal absorption. A sample with extremely short mixing time would also be considered undesirable as a good strong spring wheat. When a sample is in the minimal range for these values, it is considered as questionable until further testing demonstrates whether a definite deficiency exists.

Doughs having mellow to weak dough properties show a tendency towards weakness. Also, for mellow to strong, the dough is mellow, but has a tendency to be strong, and a strong to mellow dough is just the reverse. Since these characteristics are subjective rather than objective, it is necessary at times to estimate the tendency; therefore, the necessity exists for apparent double grades.

FIELD PLOT NURSERY SAMPLES

Sixty-seven field plot nursery samples were received from three states and six stations. The data for these individual samples are given in Tables 1 through 3. In Table 4 are given the averages for the varieties by states. Also, for each state is given the 1962 and 1963 averages for the standard named commercial varieties for each of the states.

Minnesota Samples

Thirty-two samples were received from four Minnesota stations: Crookston, Morris, Rosemount and Waseca. Twenty of these samples were known named varieties, Crim, Justin, Pembina and Thatcher. Twelve of these samples were three new varieties, Minnesota Sel. II-53-525-1, II-54-29, and II-54-30. The results for each of these varieties are given in Table 1 and the averages in Table 4.

II-53-525-1 (C.I. 13751)

Kernel Characteristics - Satisfactory to Questionable. Good test weight, low 1000 kernel weight and small kernel size.

Milling Performance - Questionable to Satisfactory. Extraction was satisfactory, flour mineral good, tendency to show softness in milling characteristics.

Baking Evaluation - Satisfactory to Questionable. Minimum mixing times and crumb grain.

II-54-29 (C.I. 13654)

Kernel Characteristics - Satisfactory.

Milling Performance - Very Satisfactory. High extraction, low flour ash.

Baking Evaluation - Questionable. Mixing time good, doughs show tendency to be bucky.

II-54-30 (C.I. 13655)

Kernel Characteristics - Satisfactory.

Milling Performance - Very Satisfactory. High extraction, low flour ash.

Baking Evaluation - Questionable. Minimum absorption and mixing time.

South Dakota Samples

Nine samples were received from Brookings, South Dakota. Six of these samples were named varieties, Conley, Crim, Lee, Pembina, Selkirk, Thatcher, and three were new varieties under test, RL 2938, ND 256, and II-53-525-1. The results of these samples are given in Tables 2 and 4. The samples from the 1963 crop were much better than those of the 1962 crop, having much higher test weights, and lower wheat ash.

RL 2938 (C.I. 13463)

Kernel Characteristics - Questionable. Kernel size distribution was questionable.

Milling Performance - Questionable. Extraction was satisfactory, flour ash was high and had a tendency towards soft milling characteristics.

Baking Evaluation - Satisfactory.

ND 256 (C.I. 13608)

Kernel Characteristics - Questionable. Kernel size distribution was questionable.

Milling Performance - Questionable. High flour ash, low extraction, and a tendency to have soft milling characteristics.

Baking Evaluation - Satisfactory. Good absorption.

II-53-525-1 (C.I. 13571)

Kernel Characteristics - Questionable. Kernel size distribution was questionable.

Milling Performance - Satisfactory.

Baking Evaluation - Unsatisfactory. Short mixing time and poor crumb grain.

Wisconsin Samples

Twenty-six samples were received from Madison, Wisconsin station. Six of these samples were named varieties, several of the samples were the same variety or selection raised in different plots. Therefore, 18 actual samples were tabulated in the averages. The protein contents of the 1963 crop samples were much lower than for the 1962 crop and in fact are of sufficient deficiency as to make the samples all undesirable to questionable in baking evaluation when compared with normal hard red spring wheats.

H515B 7-2-12-5

Kernel Characteristics - Satisfactory. Protein content was extremely low.

Milling Performance - Very Satisfactory. Good extraction, extremely low flour ash.

Baking Evaluation - Unsatisfactory to Questionable. Poor interior of the loaf and low absorption.

28-1

Kernel Characteristics - Satisfactory.

Milling Performance - Very Satisfactory. Flour extraction was excellent, flour ash very good.

Baking Evaluation - Unsatisfactory. Short mixing time, weak dough characteristics.

32-2

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Unsatisfactory. Low absorption, short mixing time, and weak dough characteristics.

5-5-4-1

Kernel Characteristics - Satisfactory. Test weight minimal.

Milling Performance - Satisfactory.

Baking Evaluation - Unsatisfactory to Questionable. Low absorption and minimum crumb grain.

6-10-2-4

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Questionable to Unsatisfactory. Low absorption and minimal crumb grain.

6-12

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Questionable. Minimum absorption.

6-16-2 (C.I. 13588)

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Questionable to Unsatisfactory. Low absorption and minimum crumb grain.

6-16-2-5-4

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Unsatisfactory to Questionable. Low absorption and minimum crumb grain.

4-2-4

Kernel Characteristics - Satisfactory. Extremely high potential yield and percentage of large kernels was high.

Milling Performance - Satisfactory. Flour mineral low.

Baking Evaluation - Unsatisfactory to Questionable. Low absorption and minimum crumb grain.

4-3

Kernel Characteristics - Satisfactory.

Milling Performance - Very Satisfactory. Good flour extraction and low flour ash.

Baking Evaluation - Unsatisfactory. Low absorption and tendency for weak doughs.

18Y-4M-1 (C.I. 3965)

Kernel Characteristics - Satisfactory. Good potential yield.

Milling Performance - Satisfactory to Questionable. Extraction and flour ash were good, milling characteristics had a tendency towards softness.

Baking Evaluation - Unsatisfactory. Bake absorption low, mixing time short, dough characteristics were weak.

Wisc. 254

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Unsatisfactory to Questionable. Bake absorption low, doughs showed a tendency to be weak.

UNIFORM REGIONAL NURSERY SAMPLES

A total of 388 uniform regional nursery samples were received. These samples represented 13 stations. However, three blends were made comprising two stations each where the wheats were compatible and of close origin. To determine compatibility, the wheats must be within one-half percent in protein content, similar kernel size distribution, test weight within 1/2 lb., and the same kernel textures. Any samples, regardless of the origin, which showed differences in the characteristics and were not compatible, were milled as individual samples to eliminate any possible erroneous results due to incompatibility. Thus, a total of 299 samples were milled and baked which included the blends and individual samples. Thirty samples were received from each of the stations, except Brookings and Watertown. From these two stations, the Marquis variety was not included. Twenty-three new varieties or selections were included for quality evaluation in the uniform regional nursery samples. The remainder of the samples were the commercially named varieties Crim, Justin, Lee, Marquis, Pembina, Selkirk, and Thatcher.

Thirty samples were received from Fort Collins, Colorado, seven named varieties and 23 new varieties. Data are given in Table 5.

Ninety samples were received from the three Minnesota stations of Crookston, Morris, and St. Paul. However, because of compatibility and similarity of the samples, a blend was made between the Morris and St. Paul samples (Table 6) and also between the Casselton, North Dakota and Crookston, Minnesota samples (Table 7). Each station had submitted seven named varieties and 23 unnamed varieties.

Ninety samples were received from the three stations in Montana, Bozeman, Havre, and Sidney. Each of these submitted the seven named varieties and 23 unnamed varieties. The results are given in Tables 8, 9, and 10 respectively.

Actually, 120 samples were received from the four North Dakota stations of Casselton, Dickinson, Langdon, and Williston. However, the Dickinson samples were received too late to be processed and included with the other samples. The Dickinson samples were very similar to the Williston samples and should give essentially the same results as the Williston samples. Because of the similarity and compatibility of the Casselton and Crookston samples, they were blended. The data for these blends are given in Table 7. The results for Langdon and Williston are given in Tables 11 and 12, respectively. Each of these stations submitted seven commercial named varieties and 23 selections.

Fifty-eight samples were received from the South Dakota stations of Brookings and Watertown. Because of the similarity of these samples, they were blended and the data are given in Table 13. Only six named commercial varieties were submitted from these stations with Marquis being omitted. However, the 23 unnamed varieties were submitted.

The same series of 30 samples was submitted from the Madison, Wisconsin station. The data are given in Table 14,

In Table 15 are given the average results for each of the 30 samples submitted from the five states and 13 stations. The only exception is for the Marquis variety which was not submitted by the two South Dakota stations. The individual results for the unnamed varieties or selections grown in the uniform regional nursery samples are given in Tables 5 through 14. However, as in last year's report, for simplicity and brevity of the report, each variety will be discussed from the general overall average of these results. The discussion of these varieties will be a general nature and comparative to the milling and baking standard Selkirk variety which was of minimal quality that would be acceptable for spring wheats.

In addition to the averages of all stations, in Table 16 are given the averages by states of the 6 named varieties Crim, Justin, Lee, Pembina, Selkirk, and Thatcher, with the exclusion of Marquis. This should give a comparison of the varieties by states. Also given in this table are the averages by states of the 6 varieties for comparative purposes. The 1963 grand average is given for Minnesota, Montana, North Dakota, South Dakota, and Wisconsin, and the 1962 average for the same states and the same varieties for comparative purposes. The overall average results indicate that the 1963 crop is not quite as good as the 1962 crop; however, it is of acceptable spring wheat quality.

The average results for the new varieties or selections were:

RL 4133 (C.I. 13776)

Kernel Characteristics - Questionable to Satisfactory. 1000 kernel weight and kernel size distribution.

Milling Performance - Questionable to Satisfactory. Extraction of flour and flour ash.

Baking Evaluation - Questionable. Minimum mixing time and tendency towards weak doughs, as well as low loaf volume.

RL 4137 (C.I. 13777)

Kernel Characteristics - Questionable to Satisfactory. 1000 kernel weight and kernel size distribution are minimal.

Milling Performance - Questionable to Satisfactory. Minimum flour extraction.

Baking Evaluation - Questionable to Unsatisfactory. Minimum absorption and tendency for weak doughs and low loaf volume.

RL 4159 (C.I. 13775)

Kernel Characteristics - Questionable. 1000 kernel weight and kernel size distribution.

Milling Performance - Questionable to Satisfactory. Minimal extraction and tendency towards high ash.

Baking Evaluation - Unsatisfactory to Questionable. Low absorption and short mixing time with a tendency for weak doughs.

ND 229-1 (C.I. 13589)

Kernel Characteristics - Satisfactory to Questionable. Test weight minimal.

Milling Performance - Questionable. Low flour extraction and a tendency to show soft milling characteristics.

Baking Evaluation - Questionable. Minimum absorption and a tendency towards weak doughs.

ND 247 (C.I. 13568)

Kernel Characteristics - Questionable to Satisfactory. Kernel size distribution and 1000 kernel weight were minimal.

Milling Performance - Questionable. Low extraction and relatively high ash.

Baking Evaluation - Satisfactory to Questionable.

ND 256 (C.I. 13608)

Kernel Characteristics - Satisfactory to Questionable. Kernel size distribution was minimal.

Milling Performance - Questionable to Unsatisfactory. Low extraction, high ash and a definite tendency towards soft milling characteristics.

Baking Evaluation - Questionable to Satisfactory. Dough characteristics exhibited weakness.

ND 264 (C.I. 13569)

Kernel Characteristics - Satisfactory to Questionable. Kernel size distribution questionable.

Milling Performance - Questionable. Minimal flour extraction.

Baking Evaluation - Questionable. Dough showed tendency towards weakness.

ND 271 (C.I. 13571)

Kernel Characteristics - Satisfactory to Questionable. Minimum test weight.

Milling Performance - Questionable to Unsatisfactory. Low flour extraction and a tendency to show softness in milling characteristics.

Baking Evaluation - Questionable. Tendency towards weak doughs.

ND 287 (C.I. 13590)

Kernel Characteristics - Satisfactory to Questionable. Minimum test weight.

Milling Performance - Unsatisfactory to Questionable. Low extraction, high flour ash and soft milling characteristics.

Baking Evaluation - Questionable. Absorption of several samples was low or minimal.

ND 345 (C.I. 13653)

Kernel Characteristics - Questionable to Satisfactory. 1000 kernel weight, kernel size distribution minimum.

Milling Performance - Satisfactory to Questionable. Somewhat erratic results in milling performance.

Baking Evaluation - Questionable. Minimum absorption.

ND 404 (C.I. 13788)

Kernel Characteristics - Satisfactory to Questionable.

Milling Performance - Questionable. Low extraction with tendency to show soft milling characteristics.

Baking Evaluation - Questionable to Unsatisfactory. Minimum bake absorption and tendency to exhibit weak doughs.

ND 405 (C.I. 13779)

Kernel Characteristics - Satisfactory to Questionable.

Milling Performance - Questionable to Satisfactory. Minimum flour extraction.

Baking Evaluation - Questionable. Tendency towards poor interior in finished loaf.

ND 406 (C.I. 13780)

Kernel Characteristics - Satisfactory.

Milling Performance - Unsatisfactory to Questionable. Low flour extraction and definite softness in milling characteristics.

Baking Evaluation - Questionable to Unsatisfactory. Minimum bake absorption, mixing time, poor interior of finished loaf, and low loaf volume.

II-52-238 (C.I. 13572)

Kernel Characteristics - Questionable to Satisfactory. Kernel size distribution and 1000 kernel weight are minimum.

Milling Performance - Questionable to Satisfactory. Somewhat erratic results in milling performance.

Baking Evaluation - Unsatisfactory to Questionable. Short mixing time and a tendency for weak doughs and poor interior of grain.

II-53-521 (C.I. 13657)

Kernel Characteristics - Questionable to Satisfactory. Low kernel size distribution and 1000 kernel weight.

Milling Performance - Questionable to Satisfactory. Minimum flour extraction, somewhat erratic results.

Baking Evaluation - Questionable to Unsatisfactory. Low bake absorption and minimum loaf volume.

II-53-525-1 (C.I. 13751)

Kernel Characteristics - Questionable to Satisfactory. 1000 kernel weight and kernel size distribution are minimal.

Milling Performance - Questionable to Satisfactory. Minimum flour extraction.

Baking Evaluation - Unsatisfactory to Questionable. Minimum bake absorption, short mixing time, poor interior of finished loaf and minimum loaf volume.

II-54-29 (C.I. 13654)

Kernel Characteristics - Satisfactory to Questionable. Kernel size distribution, minimal.

Milling Performance - Satisfactory. Good extraction, low ash.

Baking Evaluation - Questionable. Bake absorption low, variable dough characteristics, poor interior of loaf, and loaf volume was minimum.

II-54-30 (C.I. 13655)

Kernel Characteristics - Satisfactory to Questionable. Minimum kernel size distribution.

Milling Performance - Satisfactory. Good flour extraction, good low flour ash.

Baking Evaluation - Unsatisfactory to Questionable. Low baking absorption, minimum mixing time, tendency towards weak doughs, crumb grain and loaf volume minimal.

II-55-11 (C.I. 13773)

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory to Questionable. Somewhat erratic milling results.

Baking Evaluation - Questionable to Satisfactory. Minimum baking absorption, occasional tendency towards weak doughs.

II-55-12 (C.I. 13774)

Kernel Characteristics - Satisfactory.

Milling Performance - Questionable to Satisfactory. Somewhat erratic milling results.

Baking Evaluation - Questionable. Minimum bake absorption, and a tendency towards weak doughs.

B 61-88 (C.I. 13772)

Kernel Characteristics - Questionable to Satisfactory. Minimum test weight.

Milling Performance - Questionable to Unsatisfactory. Low absorption, high ash, and a tendency to show softness in milling characteristics.

Baking Evaluation - Questionable. Somewhat erratic results with minimum grain for interior of the loaf.

B 61-95 (C.I. 13586)

Kernel Characteristics - Questionable to Satisfactory. Minimum kernel size distribution.

Milling Performance - Low extraction with a tendency towards soft milling characteristics.

Baking Evaluation - Questionable to Unsatisfactory. Low absorption, with a tendency to show weak dough characteristics and somewhat poor interior of loaf.

Wisc. 6-16-2

Kernel Characteristics - Satisfactory to Questionable. Somewhat erratic results for 1000 kernel weight, test weight, and kernel size distribution.

Milling Performance - Questionable to Satisfactory. Erratic results, low extraction, tendency towards high ash.

Baking Evaluation - Questionable to Satisfactory. Somewhat erratic results.

OBSERVATION NURSERY SAMPLES

Two sets of observation nursery samples were received from South Dakota. One series consisted of 100 samples received from the Brookings station, which were submitted for the first time this year for evaluation. The bulk of these samples were left at the South Dakota Experiment Station by Dr. D. G. Well's predecessor. These samples were milled and mixograph curves were run on each sample. Sixty of these samples were discarded from further testing because of the extremely poor pattern obtained on the mixograph and had a range of from 1 to 2 which are entirely unacceptable for strong spring wheats. The forty remaining samples of this series were baked and the results are given in Table 17. Two named varieties were grown with this series, Justin and Selkirk. Most of these samples were also rated as undesirable for the baking evaluation, primarily due to the extremely short mixing times, however, many samples did have low absorption too.

Only four of the selections from the Brookings samples were rated as satisfactory to questionable, for baking. Therefore, only these four selections will be discussed.

The results for the Brookings, South Dakota Observation Nursery samples were rated as follows:

Sel.No. 11296

Kernel Characteristics - Satisfactory. Test weight, 1000 kernel weight and kernel size distribution minimum.

Milling Performance - Questionable. Low extraction and high ash.

Baking Evaluation - Questionable to Unsatisfactory. Minimum absorption, short mixing time, and weak dough characteristics as well as low loaf volume.

Sel. No. 11298

Kernel Characteristics - Questionable. Low test weight, low 1000 kernel weight, and small kernel size distribution.

Milling Performance - Questionable. Minimal extraction, high ash.

Baking Evaluation - Questionable. Minimum absorption, minimum mixing time, tendency for weak doughs.

Sel. No. 11378

Kernel Characteristics - Questionable to Unsatisfactory. Low test weight, low 1000 kernel weight, small kernel size distribution, high ash.

Milling Performance - Questionable to Unsatisfactory. Low extraction, high flour ash.

Baking Evaluation - Satisfactory. Good dough characteristics.

Sel. No. 11407

Kernel Characteristics - Questionable. Minimum test weight and kernel size distribution, high wheat ash.

Milling Performance - Satisfactory to Questionable. High flour ash.

Baking Evaluation - Questionable. Short mixing time.

Obreg. 611 (PSWI)

Kernel Characteristics - Questionable to Unsatisfactory. Minimum test weight, 1000 kernel weight, small kernel size distribution and high ash.

Milling Performance - Questionable to Unsatisfactory. Low extraction, high ash and soft milling characteristics.

Baking Evaluation - Satisfactory to Questionable. Interior of loaf open and irregular of minimum quality.

Obreg. 623 (PSWI)

Kernel Characteristics - Questionable. Minimum test weight, 1000 kernel weight, kernel size distribution and high wheat ash.

Milling Performance - Unsatisfactory. Extremely low extraction, high flour ash, and soft milling characteristics.

Baking Evaluation - Unsatisfactory. Short mixing time, tendency towards weak doughs, and low loaf volume.

Obreg. 689 (PSWI)

Kernel Characteristics - Unsatisfactory to Questionable. Low test weight, low 1000 kernel weight, small kernel size distribution, and high wheat ash.

Milling Performance - Unsatisfactory to Questionable. High flour ash.

Baking Evaluation - Satisfactory.

Obreg. 694 (PSWI)

Kernel Characteristics - Questionable to Unsatisfactory. Minimum test weight, 1000 kernel weight, small kernel size distribution and high wheat ash.

Milling Performance - Unsatisfactory to Questionable. Low extraction and soft milling characteristics.

Baking Evaluation - Unsatisfactory. Short mixing times and low loaf volumes.

Obreg. 711 (PSWI)

Kernel Characteristics - Questionable. Low test weight, 1000 kernel weight, and a small kernel size distribution.

Milling Performance - Questionable. High flour ash.

Baking Evaluation - Satisfactory.

Obreg. 738 (PSWI)

Kernel Characteristics - Questionable to Unsatisfactory. Low test weight, low 1000 kernel weight, and small kernel size distribution.

Milling Performance - Questionable. High flour ash.

Baking Evaluation - Satisfactory to Questionable. Somewhat poor interior grain structure of the loaf.

Obreg. 812 (PSWI)

Kernel Characteristics - Questionable. Minimum test weight, low 1000 kernel weight, small kernel size distribution.

Milling Performance - Questionable to Satisfactory. Tendency for erratic results.

Baking Evaluation - Questionable. Minimum mixing time.

Obreg. 858 (PSWI)

Kernel Characteristics - Questionable. Low test weight, 1000 kernel weight, and small kernel size distribution.

Milling Performance - Questionable. Erratic results.

Baking Evaluation - Satisfactory.

Kernel Characteristics - Questionable. Low test weight, 1000 kernel size distribution.

Speed 812 (PSW)

Kernel Evaluation - Questionable. Minimum testing time.

Kernel Characteristics - Questionable. Minimum test weight, low test weight, 1000 kernel size distribution.

Speed 812 (PSW)

Kernel Characteristics - Questionable. Minimum test weight, low test weight, 1000 kernel size distribution.

Kernel Evaluation - Questionable. Minimum testing time.

Kernel Characteristics - Questionable. Minimum test weight, low test weight, 1000 kernel size distribution.

Speed 812 (PSW)

Kernel Evaluation - Questionable. Minimum testing time.

Kernel Characteristics - Questionable. Minimum test weight, low test weight, 1000 kernel size distribution.

Obreg. 720 (PSWII)

Kernel Characteristics - Questionable. Low test weight and 1000 kernel weight, kernel size distribution and wheat ash.

Milling Performance - Unsatisfactory, Low extractions, soft milling characteristics.

Baking Evaluation - Questionable. Minimum mixing time and loaf volume.

SAWFLY YIELD NURSERY SAMPLES

Fifteen samples were received from the Sawfly Yield Nursery plots and were a blend of Cutbank and Sidney, Montana. Five of these samples were named varieties. Ten samples were selections or new varieties.

The results for these samples are given in Table 19. The kernel characteristics for all of these samples were rated as questionable due primarily to the low 1000 kernel weight and kernel size distribution. There was a large percentage of medium and small kernels in these samples.

The results were:

B-60-92

Kernel Characteristics - Questionable.

Milling Performance - Satisfactory.

Baking Evaluation - Satisfactory.

60-6 (C.I. 13592)

Kernel Characteristics - Questionable.

Milling Performance - Satisfactory. Good extraction, low flour ash.

Baking Evaluation - Satisfactory. Minimum bake absorption.

60-7 (C.I. 13593)

Kernel Characteristics - Questionable.

Milling Performance - Satisfactory

Baking Evaluation - Satisfactory. Good mixing time.

60-9 (C.I. 13594)

Kernel Characteristics - Questionable.

Milling Performance - Satisfactory.

Baking Evaluation - Questionable to Satisfactory. Interior of loaf questionable and poorest of selections submitted.

60-25 (C.I. 13595)

Kernel Characteristics - Questionable.

Milling Performance - Satisfactory. Good extraction and low flour ash.

Baking Evaluation - Satisfactory.

60-54 (C.I. 13596)

Kernel Characteristics - Questionable.

Milling Performance - Satisfactory. Good extraction.

Baking Evaluation - Satisfactory. Good absorption and mixing time.

5512-641 (C.I. 13597)

Kernel Characteristics - Questionable.

Milling Performance - Satisfactory.

Baking Evaluation - Satisfactory. Interior of loaf, minimum.

5130-14 (C.I. 13598)

Kernel Characteristics - Questionable.

Milling Performance - Questionable. Extraction satisfactory, ash higher than desired.

Baking Evaluation - Satisfactory. Good absorption.

B 57-211 (C.I. 13617)

Kernel Characteristics - Questionable to Unsatisfactory. Low test weight, and high percentage of small kernels.

Milling Performance - Satisfactory. Flour ash maximum.

Baking Evaluation - Satisfactory to Questionable. Interior of loaf poorer than desired.

B 61-18 (C.I. 13762)

Kernel Characteristics - Questionable to Unsatisfactory. Low test weight and 1000 kernel weight and large percentage of small kernels.

Milling Performance - Unsatisfactory to Questionable. Low extraction and soft milling characteristics.

Baking Evaluation - Satisfactory. Minimum bake absorption.

SPECIAL SAMPLES

Two hundred and sixteen special samples were received from Brookings, South Dakota. These samples were some additional selections which had been stored and set aside by Dr. Well's predecessor. The samples were milled and mixogram curves run for screening out those samples with poor milling characteristics and mixogram patterns. The purpose of this screening test was to minimize the number of samples which might be planted for the 1964 crop for quality evaluation. Since no quality information had been obtained on these samples, some of which were from the 1959 crop, it was felt advisable to make a preliminary screening of the samples prior to planting for quality evaluation.

The results of these samples are given in Table 20. Only 125 samples of the 216 had mixogram patterns that were rated as 3 or better. Therefore, Table 20 includes only those samples with such ratings or classifications.

Because some of the samples had been damaged from the prolonged storage period, they were not screened according to milling performance. As will be noted by the percent extraction, many of the samples yielded flour extractions below 60%.

TABLE 1

MINNESOTA FIELD PLOT NURSERY SAMPLES

Variety or State Sel. No.	C.I.No.	T.W. #/Bu.	1000 Kwt.	Lg.K.	Med.K.	Sm.K.	Pot.	Wht.	Wht.	Kern.	Flr. Min.@ Ext. 65%Ex.	Flr. Min. 2/	Flr. Mig. Char. 4/	Mlg. Per. 3/	Mix. Mix.	Bake Mix. Abs. Time 2/	Dough Char. Color 1/	Crumb Grain Vol. g/	Loaf Grain Vol. 3/	Bake Eval.					
							Yld.	Min.	Pro.	Char.					Abs.						Pat.	Abs.			
Crookston, Minnesota																									
Crim	13465	57.8	29.8	43	55	2	75.1	1.72	15.0	S	67.1	.37	13.3	N	S	62.5	9	61.5	5-1/4	S	110	90	795	S-Q	
Justin	13462	59.3	30.4	45	53	2	75.2	1.81	13.8	S	68.6	.34	13.7	N	VS	62.8	6	61.8	4-1/4	S	110	95	835	S	
Pembina	13332	57.1	26.5	9	87	4	73.3	1.73	14.7	Q	68.0	.39	13.6	N	S	64.2	8	62.7	6-1/2	S	95	80	870	S	
Selkirk	13100	56.3	27.7	15	76	9	73.3	1.81	12.8	Q	70.4	.35	12.1	N	VS	60.3	4	59.3	4	M-W	95	95	805	U	
Thatcher	10003	57.8	23.9	7	86	7	73.0	1.68	13.0	U	67.5	.38	12.1	N	S	60.0	6	59.0	3-3/4	M	100	90	810	U	
II-53-525-1	13751	59.6	24.8	11	85	4	73.4	1.61	14.0	U-Q	67.9	.34	13.4	N	VS	62.8	5	61.8	3-3/4	M	110	C	80	790	Q
II-54-29	13654	61.3	32.3	35	63	2	74.7	1.62	13.4	S	70.6	.30	12.6	N	VS	60.3	10	59.3	7-1/4	M	110	C	90	785	Q-U
II-54-30	13655	62.3	30.3	25	72	3	74.1	1.63	13.6	S	70.7	.31	12.8	N	VS	61.6	6	60.6	7-1/4	M	100	C	95	810	Q
Morris, Minnesota																									
Crim	13465	57.5	26.7	31	64	5	74.3	1.77	16.2	S	66.3	.38	14.1	N	S	66.6	7	64.6	6-1/4	S	110	100	860	S	
Justin	13462	57.2	27.6	37	58	5	74.6	2.07	17.2	Q	67.2	.38	16.3	N	S	66.3	6	64.3	4	S	105	90	10	910	S
Selkirk	13100	54.0	26.7	23	70	7	73.8	1.86	16.5	U	67.9	.40	15.6	N	S	66.0	4	64.5	3-1/4	M-W	95	C	100	875	S-Q
Pembina	13332	55.8	23.6	13	78	9	73.2	1.71	14.9	Q-U	66.8	.38	15.0	N	S	63.2	7	61.2	6-1/2	S	95	90	865	Q	
Thatcher	10003	54.8	20.4	5	83	12	72.7	1.83	15.3	U	65.7	.39	14.4	N-S	Q-S	62.5	5	61.5	3	M	100	C	95	860	Q-S
II-53-525-1	13751	59.8	26.9	32	63	5	74.4	1.82	16.9	S	65.5	.36	15.9	N-S	S-Q	65.0	4	63.0	2-1/2	S	105	80	1000	S	
II-54-29	13654	61.0	30.1	36	59	5	74.6	1.68	15.8	S	68.5	.32	14.9	N	VS	64.2	7	63.2	6-1/4	B	100	C	90	890	Q
II-54-30	13655	61.9	30.8	33	62	5	74.4	1.67	15.8	S	69.0	.33	14.5	N	VS	63.8	4	62.8	2-3/4	S	100	C	95	920	S
Rosemount, Minnesota																									
Crim	13465	58.7	29.1	38	58	4	74.7	1.70	17.4	S	62.5	.41	16.5	N	U-Q	68.8	5	67.3	3-1/4	S	100	W	90	895	S
Justin	13462	58.0	29.4	49	48	3	75.3	1.75	18.3	S	65.8	.39	17.2	N	S	68.2	6	67.2	3-3/4	S	100	80	945	S	
Pembina	13332	58.2	25.5	14	81	5	73.5	1.70	16.9	Q	65.7	.39	16.5	N	S	66.6	7	65.6	5	B	90	G	90	945	Q
Selkirk	13100	56.3	28.0	14	81	5	73.4	1.83	17.3	Q	68.5	.38	16.5	N	S	66.6	5	65.6	3	W-M	100	95	900	Q-U	
Thatcher	10003	57.6	23.1	8	82	10	72.9	1.95	16.5	U	64.8	.44	16.0	N-S	U	65.0	4	63.5	3	S	100	90	905	S	
II-53-525-1	13751	58.6	28.2	28	68	4	74.2	1.67	18.1	S	63.9	.37	17.0	N	Q	66.0	4	65.0	2-3/4	M-S	110	70	1010	Q-S	
II-54-29	13654	59.7	32.8	37	60	3	74.7	1.64	17.5	S	66.7	.34	16.5	N	VS	66.3	6	65.3	5	B	90	G	95	895	Q
II-54-30	13655	61.2	31.2	32	65	3	74.5	1.62	17.2	S	69.2	.34	16.1	N	VS	66.3	5	65.3	3	M-S	100	90	905	S	
Waseca, Minnesota																									
Crim	13465	61.3	31.5	53	44	3	75.5	1.73	14.6	S	64.4	.39	13.6	N-S	S-Q	67.0	5	65.0	3-1/2	S	100	95	785	S	
Justin	13462	60.2	30.8	53	44	3	75.5	1.95	16.1	S	66.2	.37	15.2	N	S	66.6	6	64.6	4-3/4	S	100	95	646	S	
Pembina	13332	60.0	27.4	19	76	5	73.7	2.00	16.9	S-Q	66.1	.41	13.6	N	Q	64.2	7	62.2	5	S	100	100	920	S	
Selkirk	13100	58.9	31.5	35	60	5	74.5	1.95	14.8	S	69.3	.41	14.3	N	Q	65.3	3	63.3	3-1/2	W-M	100	100	810	Q	
Thatcher	10003	60.5	23.4	8	87	5	73.2	1.88	14.3	Q	65.8	.44	13.6	N-S	U	62.3	4	60.3	3-1/4	S	100	95	840	Q	
II-53-525-1	13751	62.2	30.0	43	55	2	75.1	1.77	15.5	S	63.6	.38	14.5	N-S	Q	64.2	4	62.2	3	S	100	W	100	895	S
II-54-29	13654	62.8	33.7	53	45	2	75.6	1.74	14.7	S	67.5	.36	13.5	N-S	S	62.5	6	60.5	4-3/4	S	100	C	90	795	Q
II-54-30	13655	63.5	32.6	45	54	1	75.2	1.76	14.3	S	68.8	.34	13.3	N	VS	62.3	4	60.3	2-3/4	S	95	C	100	805	U-Q

1/ Clean dry - subtract 1#/bu. for dockage free T. W.

2/ 14% moisture basis.

3/ VS - Very Satisfactory, S - Satisfactory, Q - Questionable, U - Unsatisfactory.

4/ N - Normal, H - Hard, S - Soft.

5/ Refer to reference mixogram for numerical curve pattern.

6/ B - Bucky, S - Strong, M - Mellow, W - Weak, D - Dead.

7/ C - Creamy, G - Gray, D - Dull, Sl - Slightly, V - Very, B - Bright, W - White.

8/ O - Open, I - Irregular, S - Soggy, T - Thick wall, Sl - Slightly, C - Close.

TABLE 2

FIELD PLOT NURSERY SAMPLES

Brookings, South Dakota

Variety or State Sel. No.	C.I.No.	T.W. #/Bu.	1000 Kwt.	Lg.K.	Med.K.	Sm.K.	Pot. Yld.	Wht.		Wht. Pro.	Kern. Char.	Flr. Min. Ext.	Min. 65%Ex.	Flr. Pro.	Min. Char.	Mlg. Per.	Mix. Abs.	Mix. Pat.	Bake Mix. Abs. Time	Dough Char.	Crumb Color	Crumb Grain Vol.	Loaf Eval.	Bake	
								2/ 2/	2/ 3/																2/ 2/
cc.																									
Conley Crim Lee Pembina Seikirk	13157	57.9	26.2	6	88	6	73.0	1.82	16.1	Q	68.1	.37	14.8	N	S	66.3	6	65.3	3-1/2	M-S	100	95	880	S	
	13465	58.3	25.1	20	76	4	73.8	1.73	15.6	Q	66.2	.40	14.8	N-S	S	67.6	6	66.6	4-1/4	S	100	90	890	S	
	12488	58.7	27.3	16	81	3	73.7	1.76	15.4	Q	64.7	.39	14.3	N-S	S	64.7	4	63.7	2-3/4	M	100	95	800	Q-U	
	13332	58.4	26.5	12	84	4	73.4	1.64	16.5	Q	64.0	.38	15.0	N-S	S	64.7	4	63.5	2-3/4	M	100	90	825	Q-U	
	13100	57.2	24.4	5	89	6	73.0	1.75	16.0	Q	67.3	.38	15.2	N	S	65.3	6	64.3	4-1/4	S	100	90	870	S	
Thatcher RL2938 ND 256 II-53-525-1	10003	58.3	22.6	5	88	7	72.9	1.78	16.6	Q	65.2	.42	15.4	N-S	Q	65.3	4	64.3	2-3/4	M	90	90	850	Q-U	
	13463	57.4	24.6	12	82	6	73.3	1.78	16.0	Q	66.4	.42	15.1	N-S	Q	69.1	7	67.1	4-3/4	S	110	100	875	S	
	13608	58.3	25.7	9	83	8	73.1	1.80	16.7	Q	62.5	.44	15.4	N-S	Q	69.4	6	67.4	3-1/2	S	105	95	870	S	
	13751	60.2	23.8	6	91	3	73.2	1.76	16.1	Q	66.5	.39	15.0	N	S	65.3	5	63.3	2-1/2	S	100	75	840	U	

1/ Clean dry - subtract 1#/bu. for dockage free T.W.

2/ 14% Moisture Basis.

3/ VS - Very Satisfactory, S - Satisfactory, Q - Questionable, U - Unsatisfactory.

4/ N - Normal, H - Hard, S - Soft.

5/ Refer to reference mixogram for numerical curve pattern.

6/ B - Bucky, S - Strong, M - Mellow, W - Weak, D - Dead.

7/ C - Creamy, G - Gray, D - Dull, Sl - Slightly, V - Very, B - Bright, W - White.

8/ O - Open, I - Irregular, S - Soggy, T - Thick Wall, Sl - Slightly, C - Close.

TABLE 3

FIELD PLOT NURSERY SAMPLES

Madison, Wisconsin

Variety	C.I.No. or Sel.No.	T.W. #/Bu.	1000 Kwt.	Lg.K.	Med.K.	Sm.K.	Pot. Yld	Wht. Min.	Wht. Pro.	Kern. Char.	Flr. Min. @ Ext. 65% Ex.	Flr. Char.	Mlg. Per.	Mix. Abs. Pat.	Bake Mix. Abs. Pat.	Bake Time min.	Dough Char.	Crumb Color	Crumb Grain Vol.	Loaf Eval.	Bake Eval.				
			g.	%	%	%	%	%	%	%	%	%	%	%	%	%			cc.						
Grim Henry Justin Lathrop Lee	13465	59.8	34.4	76	22	2	76.7	1.79	11.1	S	65.4	.37	10.1	N-S	S-Q	60.3	7	60.3	6	M-S	120BW	80	660	Q	
	12265	59.2	32.9	77	21	2	76.8	1.86	11.4	S	69.5	.39	10.3	N-S	S-Q	59.0	3	59.0	2-1/2	M	110W	70	740	U	
	13462	61.4	32.9	64	34	2	76.1	1.88	12.3	S	61.8	.37	11.3	N	S	60.7	5	60.7	4-3/4	M-S	130BW	80	685	S-Q	
	13457	59.5	39.1	78	20	2	76.8	1.93	11.2	Q-S	69.4	.38	10.1	N-S	S-Q	59.3	3	58.3	2-3/4	M	120W	70	730	U	
	12488	59.1	37.2	76	23	1	76.8	1.84	12.4	S	60.8	.47	11.5	N-S	U	61.0	5	60.0	3-1/2	M	130W	70	735	U-Q	
Pembina Selkirk Thatcher H515B 7-2-12-5 Kenya 184xWisc.2504	13332	58.8	29.8	43	55	2	75.1	1.81	11.7	S	64.8	.44	10.7	N-S	U-Q	56.3	10	55.3	7	M	120W	80	685	U-Q	
	13100	57.8	36.1	62	36	2	76.0	1.89	11.1	S	68.4	.34	10.1	N-S	S	57.8	4	56.8	4-1/4	M	130W	80	685	U-Q	
	10003	60.2	30.9	52	46	2	75.5	1.79	11.6	S	63.5	.43	10.4	N-S	U	57.8	4	56.8	4-1/4	M	110W	80	670	U-Q	
	6-12	59.0	35.6	66	32	2	76.2	1.74	9.9	S	69.6	.27	10.2	N	VS	57.0	5	57.0	5	M-S	110W	70	645	U-Q	
	6-12	59.7	39.7	67	31	2	76.3	1.85	12.2	S	67.6	.39	10.8	N	S	61.9	5	61.9	5	M	110W	80	715	S-Q	
Wisc. 254		60.2	39.7	74	24	2	76.6	1.91	11.2	S	68.9	.38	10.3	N	S	61.0	3	60.5	3	M	110W	85	715	Q	
Henry Justin Lee Thatcher	14	12265	59.1	39.5	76	23	1	76.8	1.76	11.4	S	72.3	.31	10.3	N	VS	59.3	5	59.3	3-3/4	M	110W	90	710	U-Q
	8	13462	59.8	33.0	66	32	2	76.2	1.89	12.4	S	69.9	.37	11.3	N	S	60.0	7	60.0	5	M-S	120BW	80	680	U-Q
	3	12488	57.9	38.0	74	24	2	76.6	1.75	11.7	S	66.8	.39	10.7	N	S	60.3	8	60.3	5-1/2	M-S	110BW	90	670	U-Q
	1	10003	58.7	31.2	65	34	1	76.2	1.74	11.7	S	67.6	.41	10.6	N	Q	57.0	7	57.0	5-1/2	M	110W	80	685	U-Q
	15	28-1	58.5	39.2	78	20	2	76.8	1.75	12.1	S	71.2	.30	10.8	N	VS	63.2	3	62.2	2-1/2	W-M	105	90	710	U
6-16-2	17	32-2	59.2	41.5	81	18	1	77.0	1.71	11.7	S	71.9	.34	10.4	N	S	60.3	3	59.3	2-1/2	W-M	110	90	700	U
	19	5-5-4-1	56.9	39.7	75	23	2	76.7	1.81	12.7	S	70.9	.37	11.4	N	S	58.7	6	58.7	5-1/2	M	110	85	710	U-Q
	20	6-10-2-4	59.1	36.4	63	35	2	76.1	1.69	12.3	S	70.6	.33	11.2	N	S	59.0	10	59.0	6-3/4	M	100	80	710	Q-U
		6-12	58.5	37.9	60	38	2	75.9	2.03	12.8	S	68.9	.39	11.6	N	S	60.3	8	59.3	6-1/2	M	105	80	735	Q-U
	22	13588	59.0	35.8	61	38	1	76.0	1.76	12.9	S	69.5	.40	12.0	N	S	61.0	6	60.0	5-1/4	S	100	80	760	Q-U
18Y-4M-1 Wisc. 254	24	6-16-2-5-4	58.5	33.9	54	45	1	75.7	1.76	12.1	S	71.2	.39	11.0	N	S	58.3	8	57.3	6-3/4	M-S	110	80	725	U-Q
	31	4-2-4	60.3	41.8	84	15	1	77.2	1.82	11.7	S	70.4	.32	10.5	N	S	59.7	8	58.7	5	M	110	80	715	U-Q
	34	4-3	59.2	40.0	78	21	1	76.9	1.81	11.5	S	72.4	.30	10.0	N	VS	58.1	7	57.1	4	M-W	100W	90	765	U
	36	3965	59.0	38.5	73	25	2	76.6	1.76	10.5	S	71.6	.35	9.6	N-S	S-Q	57.5	2	56.5	2-1/2	W-M	120BW	95	665	U
	37		59.2	38.6	76	22	2	76.7	1.78	11.1	S	72.0	.31	10.0	N	S	57.8	4	56.9	3-3/4	M-W	110W	90	705	U

1/ Clean dry - subtract 1#/bu. for dockage free T.W.

2/ 14% moisture basis.

3/ VS - Very Satisfactory, S - Satisfactory, Q - Questionable, U - Unsatisfactory.

4/ N - Normal, H - Hard, S - Soft.

5/ Refer to reference mixogram for numerical curve pattern.

6/ B - Bucky, S - Strong, M - Mellow, W - Weak, D - Dead.

7/ C - Creamy, G - Grey, D - Dull, Sl - Slightly, V - Very, B - Bright, W - White.

8/ O - Open, I - Irregular, S - Soggy, T - Thick Wall, Sl - Slightly, C - Close.

FIELD PLOT STATE AVERAGES

Variety or State Sel. No.	C.I. No.	T.W. 1/ #/Bu.	1000 Kwt.	Lg. X. Med. X.	Sm. K.	Pot. Yld.	Wht. Min.	Wht. Pro.	Kern. Char.	Flr. Min. Ext. 65% Ex.	Flr. Mig. Pro. Char.	Mig. Per.	Mix. Mix. Abs. Pat.	Bake Mix. Abs. Time	Dough Char.	Crumb Color	Crumb Grain	Loaf Vol.	Bake Eval.																	
#/Bu.																				cc.																
% g.																				% min.																
% 2/																				% 3/	% 4/	% 2/	% 5/	% 2/	% 3/	% 4/	% 2/	% 5/	% 2/	% 3/	% 4/	% 5/	% 2/	% 3/	% 4/	% 5/
Minnesota																																				
Crim	13465	58.8	29.2	41	52	7	74.8	1.73	15.8	S	65.1	.39	14.4	N-S	S-Q	66.2	7	64.6	4-1/2	S	105	94	834	S												
Justin	13462	58.7	29.6	46	51	3	75.2	1.90	16.4	S	67.0	.37	15.6	N	S	66.0	6	64.5	4-1/4	S	104	90	889	S												
Pembina	13332	57.8	25.8	14	80	6	73.4	1.77	15.3	Q	66.7	.39	14.7	N	S-Q	64.6	7	62.9	5-3/4	S	95	90	900	S-Q												
Selkirk	13100	56.4	28.5	22	71	7	73.8	1.86	15.4	Q	69.0	.38	14.6	N	S	64.6	4	63.2	3-1/2	M-W	98	98	848	Q												
Thatcher	10003	57.7	22.7	7	84	9	72.9	1.84	14.8	U-Q	66.0	.41	14.0	N-S	Q-U	62.5	4	61.1	3-1/4	M-S	100	93	854	Q												
II-53-525-1	13751	60.1	27.5	29	67	4	74.3	1.72	16.1	S-Q	65.2	.36	15.2	N-S	Q-S	64.5	4	63.0	3	M-S	106	83	923	S-Q												
II-54-29	13654	61.2	32.2	40	57	3	74.9	1.67	15.4	S	68.3	.33	14.4	N	VS	63.3	7	62.1	5-3/4	S-B	100	91	841	Q												
II-54-30	13655	62.2	31.2	34	63	3	74.6	1.67	15.2	S	69.4	.33	14.2	N	VS	63.5	5	62.3	3	S-M	99	95	860	Q												
1963 Average 1/ 1962 Average 1/		57.7 57.6	26.6 25.6	21 25	72 67	7 8	73.7 73.9	1.80 1.88	15.3 15.1		66.7 67.1	.39 .42	14.4 13.7			64.5 62.9	5 5	63.0 62.7	4-1/4 4-1/2		100 103	94 93	859 868													
South Dakota																																				
Conley	13157	57.9	26.2	6	88	6	73.0	1.82	16.1	Q	68.1	.37	14.8	N	S	66.3	6	65.3	3-1/2	M-S	100	95	880	S												
Crim	13465	58.3	25.1	20	76	4	73.8	1.73	15.6	Q	66.2	.40	14.8	N-S	S	67.6	6	66.6	4-1/4	S	100	90	890	S												
Lee	12488	58.7	27.3	16	81	3	73.7	1.76	15.4	Q	64.7	.39	14.3	N-S	S	64.7	4	63.7	2-3/4	M	100	95	800	Q-U												
Pembina	13332	58.4	26.5	12	84	4	73.4	1.64	16.5	Q	64.0	.38	15.0	N-S	S	64.7	4	63.5	2-3/4	M	100	90	825	Q-U												
Selkirk	13100	57.2	24.4	5	89	6	73.0	1.75	16.0	Q	67.3	.38	15.2	N	S	65.3	6	64.3	4-1/4	S	100	90	870	S												
Thatcher	10003	58.3	22.6	5	88	7	72.9	1.78	16.6	Q	65.2	.42	15.4	N-S	Q	65.3	4	64.3	2-3/4	M	90	90	850	Q-U												
RL 2938	13463	57.4	24.6	12	82	6	73.3	1.78	16.0	Q	66.4	.42	15.1	N-S	Q	69.1	7	67.1	4-3/4	S	110	100	875	S												
ND 256	13608	58.3	25.7	9	83	8	73.1	1.80	16.7	Q	62.5	.44	15.4	N-S	Q	69.4	6	67.4	3-1/2	S	105	95	870	S												
II-53-525-1	13751	60.2	23.8	6	91	3	73.2	1.76	16.1	Q	66.5	.39	15.0	N	S	65.3	5	63.3	2-1/2	M	100	75	840	U												
1963 Average 1/ 1962 Average 1/		58.1 54.3	24.7 22.7	11 15	84 73	5 12	73.3 73.2	1.73 2.05	16.2 15.9		65.7 66.8	.40 .47	15.1 14.3			65.7 62.7	5 6	64.7 62.5	3-1/2 5		98 94	90 91	859 910													
Wisconsin																																				
Crim	13465	59.8	34.4	76	22	2	76.7	1.79	11.1	S	65.4	.37	10.1	N-S	S-Q	60.3	7	60.3	6	M-S	120	80	660	Q												
Justin	13462	60.6	33.0	65	33	2	76.2	1.89	12.4	S	69.0	.37	11.3	N	S	60.4	6	60.4	5	M-S	125	80	683	Q												
Lee	12488	58.5	37.6	75	23	2	76.7	1.79	12.1	S	63.8	.43	11.1	N-S	Q	60.7	7	60.2	4-1/4	M-S	120	80	703	U-Q												
Pembina	13332	58.8	29.8	43	55	2	75.1	1.81	11.7	S	64.8	.44	10.7	N-S	U-Q	56.3	10	55.3	7	M	120	80	685	U-Q												
Selkirk	13100	57.8	36.1	62	36	2	76.0	1.89	11.1	S	68.4	.39	10.1	N-S	S	57.8	4	56.8	4-1/4	M	130	80	685	U-Q												
Thatcher	10003	59.5	31.1	59	39	2	75.8	1.77	11.7	S	65.6	.42	10.5	N-S	Q	57.4	6	56.9	4-3/4	M	110	80	678	U-Q												
H515B 7-2-12-5	59.0	35.6	66	32	32	2	76.2	1.74	9.9	S	69.6	.27	10.2	N	VS	57.0	5	57.0	5	M-S	110	70	645	U-Q												
28-1	58.5	39.2	78	20	2	76.8	1.75	12.1	S	71.2	.30	10.8	N	VS	63.2	3	62.2	2-1/2	W-M	105	90	710	U													
32-2	59.2	41.5	81	18	1	77.0	1.71	11.7	S	71.9	.34	10.4	N	S	60.3	3	59.3	2-1/2	W-M	110	90	700	U													
5-5-4-1	56.9	39.7	75	23	2	76.7	1.81	12.7	S	70.9	.37	11.4	N	S	58.7	6	58.7	5-1/2	M	110	85	710	U-Q													
6-10-2-4	59.1	36.4	63	35	2	76.1	1.69	12.3	S	70.6	.33	11.2	N	S	59.0	10	59.0	6-3/4	M	100	80	710	Q-U													
6-12	59.1	38.8	63	35	2	76.1	1.94	12.5	S	68.3	.39	11.2	N	S	61.1	7	60.6	5-3/4	M	108	80	725	Q													
13588	59.0	35.8	61	38	1	76.0	1.76	12.9	S	69.5	.40	12.0	N	S	61.0	6	60.0	5-1/4	S	100	80	760	Q-U													
6-16-2-5-4	58.5	33.9	54	45	1	75.7	1.76	12.1	S	71.2	.39	11.0	N	S	58.3	8	57.3	6-3/4	M-S	110	80	725	U-Q													
4-2-4	60.3	41.8	84	15	1	77.2	1.82	11.7	S	70.4	.32	10.5	N	S	59.7	8	58.7	5	M	110	80	715	U-Q													
4-3	59.2	40.0	78	21	1	76.9	1.81	11.5	S	72.4	.30	10.0	N	VS	58.1	7	57.1	4	M-W	100	90	765	U													
18X-4M-1	59.0	38.5	73	25	2	76.6	1.76	10.5	S	71.6	.35	9.6	N-S	S-Q	57.5	2	56.5	2-1/2	W-M	120	95	665	U													
Wisc. 254	59.7	39.2	75	23	2	76.7	1.85	11.2	S	70.5	.35	10.2	N	S	59.4	4	58.7	3-1/2	M-W	110	88	710	U-Q													
1963 Average 1/ 1962 Average 1/		59.0 59.6	32.9 30.9	60 42	38 56	2 2	75.9 75.0	1.82 1.90	11.4 13.6		66.0 66.1	.41 .42	10.4 12.0			58.0 59.4	7 5	57.3 59.4	5-1/2 5		120 104	80 86	677 768													
Crop Average 1963 1/ Crop Average 1962 1/		58.3 57.2	28.1 26.4	31 27	64 66	5 7	74.3 74.0	1.78 1.94	14.3 14.9		66.1 66.6	.40 .44	13.3 13.3			62.7 61.7	6 5	61.7 61.5	4-1/2 4-3/4		106 100	88 90	798 849													

1/2, 3/4, 5/ and 6/ are the same as found on the tables of individual samples.
7/ Averages are obtained using the results for the varieties of Crim, Pembina, Selkirk, and Thatcher.

TABLE 5

UNIFORM REGIONAL NURSERY SAMPLES

Fort Collins, Colorado

Variety or State Sel. No.	C.I. No.	T.W. #/Bu.	1000 Kwt.	Lg.K.	Med.K.	Sm.K.	Pot. Yld.	Wht. Min.	Wht. Pro.	Kern. Pro.	Flr. Min. Ext.	Flr. Min. 65%Ex.	Flr. Pro.	Mlg. Char.	Mlg. Per.	Mix. Abs.	Bake Abs.	Mix. Time	Dough Char.	Crumb Color	Crumb Grain	Loaf Vol.	Bake Time	
			g.	%	%	%	%	%	%	%	%	%	%	%	%	%	%	min.				cc.		
Crim Justin Lee Marquis Pembina	13465	61.5	34.6	63	35	2	76.1	1.69	14.2	S	61.9	.45	13.6	S-N	Q-U	64.2	5	63.2	3-1/2	M	100W	80 OI	180	S
	13462	60.5	32.2	55	42	3	75.6	1.76	14.1	S	65.1	.44	13.6	N	S	62.5	3	60.5	2-1/2	M-W	100	95	145	U
	12488	62.0	35.7	61	38	1	76.0	1.70	14.6	S	61.9	.45	14.0	S-N	U-Q	62.5	3	61.5	1-3/4	M-W	100	95	162	U
	3641	61.5	33.1	51	47	2	75.5	1.73	13.1	S	62.2	.48	12.5	S-N	U	59.3	3	58.3	2-1/4	M	100W	100	150	U
	13332	60.0	29.9	31	68	1	74.5	1.70	14.3	S	64.3	.48	13.8	N	Q	62.5	5	60.5	4	M	100	100	156	Q
Selkirk Thatcher RL 4133 RL 4137 RL 4159	13100	60.0	35.5	55	42	3	75.6	1.76	13.5	S	65.6	.44	13.0	N	S	60.3	2	58.3	2	W	105	90 C	151	U
	10003	61.5	29.8	39	58	3	74.8	1.67	13.7	S	62.5	.49	12.9	S-N	U	61.6	3	60.6	2-3/4	M-W	95	90	154	Q-U
	13776	61.0	29.6	41	56	3	74.9	1.68	14.2	S	64.3	.49	13.9	N	Q	63.5	4	61.5	2-3/4	SID	80DG	90 C	152	U
	13777	61.5	29.8	41	56	3	74.9	1.71	13.2	S	64.3	.48	12.9	N	Q-S	61.3	4	59.3	3-1/4	SID	90G	80 C	136	U
	13775	61.5	28.7	37	60	3	74.7	1.70	13.6	S	66.7	.46	13.4	N	S	61.6	3	60.6	2-1/2	M	100	95	163	U
ND 299-1 ND 247 ND 256 ND264 ND 271	13589	61.5	36.2	68	29	3	76.3	1.71	12.1	S	63.6	.45	11.2	S-N	U-Q	60.3	4	59.3	3-1/2	M-W	100W	100	149	Q-U
	13568	62.0	33.0	59	38	3	75.8	1.67	13.5	S	64.0	.45	13.0	N	S-Q	63.2	5	61.2	3-1/2	M-W	110	90 O	156	Q-U
	13608	60.5	33.3	53	43	4	75.5	1.77	14.0	S	61.5	.47	13.2	N-S	Q	64.2	4	62.2	3	M-W	110W	95	154	S-Q
	13569	62.5	35.6	62	35	3	76.0	1.57	13.3	S	64.1	.43	12.1	N	S-Q	62.3	4	61.3	2-3/4	M-W	100W	100	155	Q
	13571	61.5	38.2	66	32	2	76.2	1.80	12.4	S	62.0	.45	11.5	S-N	U-Q	60.3	3	59.3	2-3/4	D	100W	90 C	143	U
ND 287 ND 345 ND 404 ND 405 ND 406	13590	61.5	34.4	62	35	3	76.0	1.73	13.7	S	63.5	.48	12.9	N	Q	63.2	4	62.2	3	M-W	100W	105	165	Q-S
	13653	62.0	32.1	50	47	3	75.4	1.65	13.5	S	66.0	.40	12.5	N	S	62.8	4	61.8	3	M	100W	100	164	S
	13778	63.0	34.0	67	31	2	76.3	1.73	12.0	S	61.0	.47	12.2	S	U	60.7	3	59.7	2-3/4	W	110W	95	158	U
	13779	60.0	37.0	56	42	2	75.7	1.84	14.2	S	64.6	.42	13.7	N	S-Q	64.7	5	63.2	3-3/4	M	100	90	182	U
	13780	62.5	34.8	59	38	3	75.8	1.72	13.2	S	60.3	.40	12.2	S	U	61.6	4	60.1	2-3/4	M	95SID	95	156	U
II-52-238 II-53-521 II-53-525-1 II-54-29 II-54-30	13572	61.5	27.9	25	71	4	74.1	1.71	14.4	S	66.7	.43	14.0	N	S	60.7	3	58.7	2	M	100	95	150	U
	13657	61.5	29.4	38	58	4	74.7	1.68	13.9	S	65.6	.46	13.0	N	S	60.3	4	58.3	3	M-W	100	95	141	U
	13751	62.0	28.8	37	60	3	74.7	1.67	12.8	S	63.5	.45	12.5	N	Q-S	61.3	3	60.3	2-1/2	M-W	100	90 C	150	U
	13654	62.5	34.2	40	57	3	74.9	1.67	12.9	S	66.0	.40	12.5	N	S	59.3	7	58.3	4-3/4	B	100	80 T	146	U
	13655	63.5	32.1	33	65	2	74.6	1.67	12.5	S	67.9	.38	12.0	N	S	59.7	3	57.7	2-3/4	M-W	110BC	95	148	U
II-55-11 II-55-12 B61-88 B61-95 Wisc.6-16-2	13773	62.0	35.5	47	50	3	75.2	1.78	14.9	S	67.0	.43	14.6	N	S	63.8	5	62.8	3-1/4	M	100W	95	182	S
	13774	62.0	35.2	45	51	4	75.1	1.79	14.7	S	64.6	.42	14.2	N	S	62.3	5	61.3	3-1/4	M-W	100	90 O	181	Q
	13772	61.5	34.5	54	42	4	75.5	1.67	13.2	S	62.2	.46	12.4	N-S	Q	62.3	4	61.3	3	M	100W	90	158	Q
	13586	62.0	32.4	39	58	3	74.8	1.70	13.1	S	62.5	.42	12.4	N-S	Q	60.3	4	59.3	3	M-W	110	90	158	U
	13588	62.0	35.7	48	49	3	75.3	1.80	14.1	S	64.9	.47	13.5	N	S	62.3	5	61.3	3-1/4	M	100	100	164	S-Q

1/ Clean dry - subtract 1#/bu. for dockage free T.W.

2/ 14% moisture basis.

3/ VS - Very Satisfactory, S - Satisfactory, Q - Questionable, U - Unsatisfactory.

4/ N - Normal, H - Hard, S - Soft.

5/ Refer to reference microgram for numerical curve pattern.

6/ B - Bucky, S - Strong, M - Mellow, W - Weak, D - Dead.

7/ C - Creamy, G - Gray, D - Dull, S1 - Slightly, V - Very, B - Bright, W - White.

8/ O - Open, I - Irregular, S - Soggy, T - Thick wall, S1 - Slightly, C - Close.

TABLE 8

UNIFORM REGIONAL NURSERY

Bozeman, Montana

Variety or State Sel. No.	C. I. No.	T. W. #/Bu.	1000 Kwt.	Lg. K.	Med. K.	Sm. K.	Pot. Yld.	Wht.	Wht.	Flr. Min. @	Flr. Mlg.	Mig.	Mix.	Bake Mix.	Dough Char.	Crumb Color	Crumb Grain	Loaf Vol.	Bake							
								Min.	Max.	Ext. 65% Ex.	Pro. Char.	Per.	Abs. Pat.	Abs. Time					Eval.							
								2/ %	2/ %	2/ %	4/ %	3/ %	2/ %	2/ %					3/ %							
Crim Justin Lee	13465	61.5	33.0	52	44	4	75.4	1.57	14.6	S	64.4	.41	14.0	N	S	65.7	4	63.7	2-1/2	M-W	120	W	90	O	158	U
	13462	61.0	32.8	43	52	5	74.9	1.65	15.7	S	65.9	.38	15.2	N	S	66.3	4	64.3	2-1/2	M-W	110	W	90	147	U	
	12788	61.5	32.9	45	52	3	75.1	1.64	15.7	S	62.1	.42	15.2	N	Q-S	64.7	2	62.7	1-3/4	M-W	100	W	95	159	U	
	3641	62.5	31.6	41	55	4	74.9	1.66	15.4	S	65.2	.41	14.8	N	S	64.4	3	62.4	1-3/4	M-W	110	W	95	158	U	
	13332	61.0	30.6	29	67	4	74.3	1.58	15.5	S	64.7	.41	15.1	N	S	64.7	3	62.7	2-1/2	M	100	W	80	165	U	
Selkirk Thatcher RL 4133 RL 4137 RL 4159	13100	61.0	34.4	44	55	1	75.2	1.63	15.1	S	67.9	.40	14.8	N	S	64.4	3	62.4	2	MSID	110	W	90	I	152	U
	10003	62.0	28.2	27	69	4	74.1	1.55	14.9	S	65.9	.40	14.4	N	S	62.8	2	60.8	1-3/4	W-M	120	W	80	T	151	U
	13776	62.0	29.5	36	59	6	74.5	1.52	14.3	S	67.4	.43	13.8	N	S	62.5	2	60.5	2	W-M	110	W	90	T	143	U
	13777	62.5	30.7	34	60	6	74.4	1.53	14.5	S	67.4	.42	13.8	N	S	62.5	2	60.5	2-1/4	D	110	W	90	T	140	U
	13775	61.5	28.2	30	67	3	74.4	1.57	15.5	S	66.4	.37	14.8	N	S	61.9	2	59.9	2	W-M	110	W	90	T	145	U
ND 229-1 ND 247 ND 256 ND 264 ND 271	13589	61.5	33.3	54	44	2	75.6	1.49	14.8	S	65.9	.39	13.9	N	S	64.7	4	62.7	2-1/4	W-M	100	W	90	152	U	
	13568	62.0	30.6	43	54	3	75.0	1.55	14.9	S	65.9	.42	14.0	N	S	65.7	4	63.7	3-3/4	M-S	120	W	750	178	S-Q	
	13608	60.5	33.6	45	50	5	75.0	1.60	15.0	S	62.1	.43	14.0	N	Q-S	64.2	2	62.2	2	D	110	W	90	T	144	U
	13569	62.5	35.5	55	41	4	75.6	1.56	15.1	S	64.4	.43	13.9	N	S	65.0	3	63.0	2-1/4	WSID	120	W	90	149	U	
	13571	62.0	36.9	57	40	3	75.7	1.59	14.9	S	64.7	.42	14.2	N	S	65.0	3	63.0	2	D	100	W	80	151	U	
ND 287 ND 345 ND 404 ND 405 ND 406	13590	61.5	32.5	51	45	4	75.4	1.62	14.5	S	63.6	.45	13.8	N	S-Q	63.8	3	61.8	2-1/4	M-W	100	W	80	158	U	
	13653	62.0	29.9	27	67	6	74.1	1.43	14.1	S	66.4	.38	12.9	N	S	62.5	3	60.5	2-1/2	M-W	100	W	80	155	U	
	13778	63.0	33.8	62	36	4	76.0	1.66	15.8	S	63.6	.40	15.0	N	S-Q	65.0	3	63.0	2-1/2	M	120	W	70	182	U	
	13779	60.5	35.6	46	50	4	75.1	1.57	15.5	S	65.2	.39	14.7	N	S	64.2	3	62.2	2	M-W	100	W	90	158	U	
	13780	63.0	34.7	57	39	4	75.7	1.56	14.8	S	61.1	.36	14.0	N-S	Q	64.4	3	62.4	2	M-W	110	W	80	151	U	
II-52-238 II-53-521 II-53-525-1 II-54-29 II-54-30	13572	62.5	29.2	25	71	4	74.1	1.55	15.6	S	68.9	.38	15.1	N	S	63.2	2	61.2	2	VW	110	BC	90	T	145	U
	13657	63.0	29.8	41	56	3	74.9	1.55	15.1	S	66.7	.37	14.8	N	S	63.2	3	61.2	2-1/2	M	110	W	75	152	U	
	13751	62.5	29.2	29	69	3	74.3	1.50	15.8	S	66.7	.37	15.4	N	S	65.0	3	63.0	2	M	110	W	80	O	156	U
	13654	64.0	32.2	32	65	3	74.5	1.43	13.0	S	70.5	.32	12.5	N	VS	61.6	2	59.6	3-1/4	M	110	W	90	151	Q-U	
	13655	64.0	30.8	20	76	4	73.8	1.44	12.9	S	69.7	.33	12.1	N	VS	60.3	2	58.3	2	SID	120	BC	80	T	141	U
II-55-11 II-55-12 B61-88 B61-95 6-16-2	13773	63.0	36.0	54	41	5	75.5	1.56	14.1	S	67.7	.37	13.5	N	S	63.8	3	61.8	2-3/4	W	115	W	90	156	U	
	13774	63.0	37.5	57	38	5	75.6	1.59	14.2	S	68.2	.37	13.6	N	S	62.5	2	60.5	2-3/4	W	110	W	90	148	U	
	13772	62.5	34.6	51	47	3	75.4	1.58	14.8	S	65.4	.39	14.3	N	S	65.3	3	63.3	2-1/2	M	120	W	95	165	U-Q	
	13586	62.0	34.7	43	55	2	75.1	1.53	15.8	S	63.6	.39	15.4	N	S	65.0	3	63.0	2	M-W	110	W	90	165	U	
	13588	62.0	33.2	36	60	4	74.6	1.56	14.0	S	65.2	.42	13.6	N	S	64.2	3	62.2	3	M-W	100	W	95	151	Q	

1/ Clean day - subtract 1#/bu. for dockage free T.W.

2/ 14% Moisture Basis.

3/ VS - Very Satisfactory, S - Satisfactory, Q - Questionable, U - Unsatisfactory.

4/ N - Normal, H - Hard, S - Soft.

5/ Refer to reference mixogram for numerical curve pattern.

6/ B - Bucky, S - Strong, M - Mellow, W - Weak, D - Dead.

7/ C - Creamy, G - Gray, D - Dull, SL - Slightly, V - Very, B - Bright, W - White.

8/ O - Open, I - Irregular, S - Soggy, T - Thick wall, SL - Slightly, C - close.

TABLE 9

UNIFORM REGIONAL NURSERY SAMPLES

Havre, Montana

Variety or State Sel. No.	C.I. No.	T.W. #/Bu.	1000 Kwt.	Lg.K. Med.K.	Sm.K.	Pot. Yld.	Wht. Min.	Wht. Pro. Char.	Kern. Pro. Char.	Flr. Min. Ext. 65%Ex.	Flr. Pro. Char.	Mlg. Per.	Mix. Abs. Pat.	Bake Mix. Abs. Time	Dough Char.	Crumb Color	Crumb Grain	Loaf Bake Vol.	Loaf Bake Eval.	cc.				
																				g.	%	%	%	%
Grim Justin Lee Marquis Pembina	13465	59.5	30.4	29	67	4	74.3	1.71	17.5	S	58.6	.52	17.1	N	U	66.6	4	64.6	2	M	110 W	100	165	U-Q
	13462	59.0	29.5	21	73	6	73.7	1.70	17.6	S-Q	61.7	.40	17.4	N	Q	67.6	4	65.6	2	M	105	85	0 156	U-Q
	12488	59.0	30.5	25	71	4	74.1	1.74	18.0	S	57.1	.54	17.5	N	U	64.4	2	61.9	2	M-W	100	100	153	U-Q
	3641	60.0	29.8	18	76	6	73.6	1.65	16.5	S-Q	63.4	.43	16.0	N	Q	67.0	4	65.0	2-1/2	M	100 W	80	0 158	U-Q
	13332	58.0	26.2	7	85	8	72.9	1.74	17.3	Q	62.9	.50	17.7	N	Q	67.0	4	63.8	2-1/2	M	100	95	156	U-Q
Selkirk Thatcher RL 4133 RL 4137 RL 4159	13100	57.5	30.1	13	77	10	73.2	1.78	17.1	Q	64.2	.48	16.9	N	Q	66.3	3	63.8	2	M-W	95	95	151	U-Q
	10003	60.0	27.3	12	79	9	73.2	1.71	17.2	Q	61.9	.51	16.6	N	Q	64.4	3	61.9	2	M-W	95	95	146	U
	13776	60.0	27.2	7	85	8	73.0	1.62	17.3	Q	63.4	.50	17.2	N	Q	66.6	4	64.6	2-1/4	M-W	95	80	145	U
	13777	60.0	27.3	4	88	8	72.8	1.60	17.1	Q	63.9	.48	17.0	N	Q	67.0	4	65.0	2-1/2	M-W	90	90	146	U
	13775	59.0	26.1	4	87	9	72.8	1.68	17.7	Q	64.9	.48	17.3	N	Q	65.3	3	62.3	2	W-M	100 C	75	153	U
ND 229-1 ND 247 ND 256 ND 264 ND 271	13589	59.5	30.9	35	60	5	74.5	1.65	17.9	S	62.4	.50	17.2	N	Q	67.6	4	65.6	2-1/4	M	110	90	170	U-Q
	13568	58.5	28.2	25	67	8	73.9	1.85	19.1	Q	58.6	.59	17.8	N	U	69.4	5	67.4	3	M	120	90	187	S
	13608	58.0	30.5	22	71	7	73.8	1.76	17.9	Q-S	58.3	.56	17.4	N	U	67.0	3	65.0	2	D	80	70	146	U
	13569	59.5	31.4	25	69	6	74.0	1.75	18.5	S	61.9	.54	18.4	N	U	67.3	4	65.3	2	M-W	90	90	149	U
	13571	59.0	33.6	28	67	5	74.3	1.66	17.7	S	62.1	.45	17.4	N	Q-S	69.1	5	67.1	2-3/4	M	110 W	95	169	Q
ND 287 ND 345 ND 404 ND 405 ND 406	13590	59.0	30.4	33	62	5	74.4	1.75	17.9	S	59.8	.55	17.4	N	U	67.3	4	65.3	2-1/4	M-W	100	90	161	U-Q
	13653	60.0	28.3	11	83	6	73.3	1.62	17.8	Q	63.4	.49	17.5	N	Q	68.7	5	66.2	3	M-W	100	90	161	Q
	13778	60.0	31.6	31	64	5	74.3	1.65	17.9	S	60.4	.53	17.3	N	Q	67.0	4	65.0	2	M	120	95	171	U-Q
	13779	58.0	32.7	19	74	7	73.6	1.76	17.8	S-Q	63.6	.46	17.9	N	Q-S	69.1	5	67.1	2	M-W	110	85	0 179	U-Q
	13780	60.5	32.3	35	59	6	74.5	1.64	16.9	S	56.4	.45	16.3	N-S	U	66.0	3	64.0	2	M-W	100 C	90	151	U
II-52-238 II-53-521 II-53-525-1 II-54-29 II-54-30	13572	60.0	26.2	7	85	8	73.0	1.72	18.0	Q	66.4	.49	17.7	N	S-Q	65.3	3	62.3	2-3/4	M	105	80	0 154	Q
	13657	59.5	26.7	11	84	5	73.3	1.59	17.1	Q-S	63.2	.46	17.0	N	Q-S	65.3	3	62.3	1-3/4	M	110	80	0 159	U
	13751	60.0	27.0	5	87	8	72.9	1.51	17.0	Q	64.2	.43	16.8	N	S-Q	64.2	4	62.2	2-1/2	M	105	70	0 161	U
	13654	61.0	30.9	10	85	5	73.3	1.59	16.9	S-Q	65.4	.42	16.8	N	S	65.0	5	62.0	3	S	105	70	0 165	Q
	13655	61.0	29.2	5	91	4	73.1	1.71	17.3	Q	65.7	.43	17.3	N	S	64.4	3	62.4	2	M	110	80	0 158	U
II-55-11 II-55-12 B61-88 B61-95 Wisc.6-16-2	13773	61.0	34.6	41	53	6	74.8	1.75	16.4	S	64.9	.46	16.3	N	S	68.0	6	66.8	3	M-S	110	95	174	S
	13774	60.0	33.3	35	59	7	74.4	1.66	16.4	S	64.7	.45	16.3	N	S	68.5	6	66.5	3-1/4	M-S	100	80	0 174	S
	13772	59.0	32.4	37	57	6	74.6	1.59	18.0	S	59.1	.45	17.7	N	U-Q	68.2	5	66.2	2-1/2	M-S	110 W	80	0 195	U-Q
	13586	59.5	33.0	25	71	4	74.1	1.53	17.4	S	60.6	.43	17.3	N	Q-S	65.0	4	62.0	2-1/4	M	110 W	85	0 160	U-Q
	13588	59.0	31.1	12	82	6	73.3	1.81	18.0	S-Q	61.2	.54	18.0	N	U	67.3	4	65.3	2-1/4	M-W	95	95	150	U

1/ Clean dry - subtract 1#/bu. for dockage free T.W.

2/ 14% moisture basis.

3/ VS - Very Satisfactory, S - Satisfactory, Q - Questionable, U - Unsatisfactory.

4/ N - Normal, H - Hard, S - Soft.

5/ Refer to reference mixogram for numerical curve pattern.

6/ B - Bucky, S - Strong, M - Mellow, W - Weak, D - Dead.

7/ C - Creamy, G - Gray, D - Dull, S1 - Slightly, V - Very, B - Bright, W - White.

8/ O - Open, I - Irregular, S - Soegy, T - Thick wall, S1 - Slightly, C - Close.

TABLE 10

UNIFORM REGIONAL NURSERY SAMPLES

Sidney, Montana

Variety or State Sel. No.	C. I. No.	T. W. #/Bu.	1000 Kwt.	Lg. K.	Med. K.	Sm. K.	Pot. Yld.	Wht. Min.	Wht. Max.	Wht. Kern. Pro. Char.	Flr. Min. @ Ext. 65% Ex.	Fir. Min. @		Mlg. Per.	Mix. Abs.	Mix. Pat.	Bake Mix. Abs. Time	Dough Char.	Crumb Color	Crumb Grain	Loaf Vol.	Bake Eval.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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1/ Clean dry - subtract 1#/bu. for dockage free T.W.

2/ 14% moisture basis.

3/ VS - Very Satisfactory, S - Satisfactory, Q - Questionable, U - Unsatisfactory.

4/ N - Normal, H - Hard, S - Soft.

5/ Refer to reference mixogram for numerical curve pattern.

6/ B - Bucky, S - Strong, M - Mellow, W - Weak, D - Dead.

7/ C - Creamy, G - Gray, D - Dull, Sl - Slightly, V - Very, B - Bright, W - White.

8/ O - Open, I - Irregular, S - Soggy, T - Thick wall, Sl - Slightly, C - Close.

TABLE 11

UNIFORM REGIONAL NURSERY SAMPLES

Langdon, North Dakota

Variety or State Sel. No.	C.I. No.	T.W. #/bu.	1000 Kwt.	Lg. K.	Med. K.	Sm. K.	Pot. Yld.	Wht. Min.	Wht. Pro.	Wht. Kern. Char.	Flr. Ext. 65% Ex.	Flr. Min. @	Flr. Pro.	Mlg. Char.	Mlg. Per.	Mix. Abs.	Mix. Pat.	Bake Abs.	Bake Mix. Time	Dough Char.	Crumb Color	Crumb Grain	Loaf Bake Vol. Eval.		
			%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%		
Crim	13465	58.0	28.3	38	60	2	74.8	1.80	14.2	S	65.6	.42	13.8	N	S	63.2	6	62.2	4	M	100	100	168	S	
Justin	13462	56.5	26.1	20	77	3	73.9	1.84	16.6	S-Q	.39	.39	16.5	N	S	67.3	7	66.3	4-1/2	M	100	C	70	168	Q
Lee	12488	58.0	27.4	21	74	5	73.8	1.82	14.5	S-Q	.64	.3	14.3	N	S-Q	62.3	5	61.3	4-1/4	M	100	95	171	S-Q	
Marquis	3641	60.5	30.1	24	71	5	74.0	1.69	14.0	S	.64	.1	13.7	N	S	60.3	6	59.3	3-3/4	M	100	95	163	Q-U	
Pembina	13332	54.5	23.6	7	86	7	73.0	1.79	14.7	U	.63	.4	14.3	N	Q	61.3	7	60.3	4-3/4	M	100	C	80	176	U-Q
Selkirk	13100	57.5	25.8	21	73	6	73.7	1.84	15.2	Q-S	.63	.9	14.9	N	Q-S	64.4	6	62.9	4	M	100	C	80	171	S
Thatcher	10003	54.5	19.8	3	86	11	72.6	1.74	14.4	U	.65	.1	14.0	N	S	61.3	5	60.3	3	M-W	90	C	80	168	Q
RL 4133	13776	60.5	27.5	32	66	2	74.5	1.56	15.3	S	.67	.1	13.6	N	VS	62.5	5	61.5	3	M-W	100	C	80	157	U-Q
RL 4137	13777	61.0	30.5	45	53	2	75.2	1.70	15.2	S	.66	.5	14.8	N	S	61.3	5	60.3	3	W	100	C	80	154	U
RL 4159	13775	59.0	25.7	18	79	3	73.8	1.76	15.6	Q	.65	.2	15.3	N	S	59.7	4	58.7	2	M-W	100	C	80	168	U
ND 229-1	13589	59.5	28.4	42	55	3	75.0	1.67	13.4	S	.67	.1	13.0	N	S	61.0	7	60.0	5-3/4	M-W	100	95	158	Q	
ND 247	13568	58.5	24.9	21	76	3	73.9	1.66	15.1	Q	.65	.8	15.0	N	S	63.2	10	61.7	8	M	110	80	178	S	
ND 256	13608	56.0	27.2	21	74	5	73.8	1.77	15.0	Q	.64	.1	14.5	N	S	63.2	7	62.2	5-1/4	M	100	90	169	S	
ND 264	13569	58.5	29.9	27	70	3	74.2	1.77	14.8	S	.64	.5	13.7	N	S	62.5	6	61.5	4-1/2	M	100	100	161	Q	
ND 271	13571	57.5	30.5	28	69	3	74.3	1.70	15.2	S	.63	.6	14.6	N	Q	63.2	5	62.2	4	M-W	100	C	95	152	Q
ND 287	13590	57.0	27.0	22	75	3	74.0	1.73	15.6	S	.64	.5	15.3	N	S	63.8	8	62.3	5-3/4	M	100	90	160	S	
ND 345	13653	58.0	26.5	13	83	4	73.5	1.67	15.5	Q	.65	.4	15.0	N	VS	62.3	9	61.3	6	S	100	C	80	172	S-Q
ND 404	13778	60.0	27.5	23	75	2	74.1	1.61	15.5	S	.66	.0	15.0	N	VS	62.5	7	61.5	4-3/4	M	100	80	161	S-Q	
ND 405	13779	59.0	34.8	41	57	2	75.0	1.68	14.3	S	.63	.8	13.8	N	S-Q	62.5	9	61.5	6-1/4	B	100	70	179	Q	
ND 406	13780	62.0	32.3	49	50	1	75.4	1.63	15.3	S	.61	.4	14.8	N	S-N	63.5	5	62.5	3-3/4	M	100	C	70	164	Q
II-52-238	13572	61.0	29.4	39	58	3	74.8	1.71	15.3	S	.67	.7	15.0	N	VS	62.5	4	61.0	2-1/4	M-W	100	C	80	170	U
II-53-521	13657	58.5	24.5	14	82	4	73.5	1.75	16.2	Q	.65	.2	15.9	N	S	62.5	5	61.5	3-1/4	M-W	100	C	70	172	Q-U
II-53-525-1	13251	61.0	29.7	41	58	1	75.0	1.73	15.4	S	.64	.9	15.1	N	S	62.5	3	61.5	2-1/4	M	100	80	165	U	
II-54-29	13654	62.0	35.8	49	50	1	75.4	1.67	14.0	S	.68	.2	13.8	N	VS	60.0	9	59.0	5	M	100	80	176	U-Q	
II-54-30	13655	62.5	32.6	43	56	1	75.1	1.62	13.9	S	.68	.2	13.4	N	VS	59.7	4	58.7	2-1/2	M	100	C	80	175	U
II-55-11	13773	61.5	35.3	47	52	1	75.3	1.62	15.1	S	.65	.8	14.5	N	S	61.9	5	60.9	3-1/4	M-W	100	80	172	U-Q	
II-55-12	13774	61.5	36.6	55	43	2	75.7	1.71	15.4	S	.64	.7	14.8	N	S	61.9	5	60.9	3	M-W	110	90	174	U-Q	
B61-88	13772	58.0	26.5	23	72	5	73.9	1.78	15.0	Q	.64	.5	14.7	N	S	64.7	6	63.2	4-1/4	M	100	C	80	177	Q
B61-95	13586	58.5	27.9	7	88	5	73.1	1.69	14.5	Q	.61	.3	14.3	N	S-N	61.9	6	60.9	4	M	95	80	181	U	
Wis. 6-16-2	13588	60.0	32.4	32	66	2	74.5	1.63	15.3	S	.65	.6	14.8	N	S	64.7	6	63.2	4	M	100	C	90	170	S

1/ Clean dry - subtract 1#/bu. for dockage free T.W.

2/ 14% moisture basis.

3/ VS - Very Satisfactory, S - Satisfactory, Q - Questionable, U - Unsatisfactory.

4/ N - Normal, H - Hard, S - Soft.

5/ Refer to reference mixogram for numerical curve pattern.

6/ B - Bucky, S - Strong, M - Mellow, W - Weak, D - Dead.

7/ C - Creamy, G - Gray, D - Dull, S1 - Slightly, V - Very, B - Bright, W - White.

8/ O - Open, I - Irregular, S - Soggy, T - Thick wall, S1 - Slightly, C - Close.

TABLE 14

UNIFORM REGIONAL NURSERY SAMPLES

Madison, Wisconsin

Variety or State Sel. No.	C. I. No.	T. W. #/bu.	1000 Kwt.	Lg. K.	Med. K.	Sm. K.	Pot. Yld.	Wht. Min.	Wht. Pro.	Wht. Char.	Flr. Min. Ext. 65% Ex.	Flr. Min. Pro.	Flr. Min. Char.	Mig. Per.	Mix. Abs.	Mix. Pat.	Bake Mix. Abs.	Bake Time	Dough Char.	Crumb Color	Crumb Grain	Loaf Bake Vol.	Bake Eval.
			%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Crim	13465	58.0	36.9	76	22	2	76.7	1.73	11.3	S	65.2	.45	10.5	N	S	60.7	8	59.7	6-1/4	M-W	130 W	75	143 U
Justin	13462	59.0	34.0	64	33	3	76.1	1.84	12.7	S	65.9	.43	11.7	N	S	60.3	7	59.3	5-1/2	M-W	120 W	80	147 Q
Lee	12488	58.0	37.3	76	22	2	76.7	1.73	11.7	S	63.6	.49	10.6	N	Q	58.7	6	58.7	5	M-W	120 W	75	144 U
Marquis	2641	59.0	34.1	68	29	3	76.3	1.82	11.0	S	65.9	.50	9.8	N	Q	55.7	6	55.7	4-1/2	M-W	120 W	80	140 U
Pembina	13332	57.5	31.4	44	53	3	75.1	1.72	11.3	S	63.6	.51	11.2	N	Q	55.1	11	55.1	6-1/2	M-W	110 W	75	147 U
Selkirk	13100	56.5	33.8	59	38	3	75.8	1.82	10.9	S	67.2	.48	10.1	N	S-Q	56.7	5	56.7	4	M-W	110	80	144 U
Thatcher	10003	58.5	30.7	52	45	3	75.5	1.69	11.4	S	66.7	.51	10.1	N	Q	55.7	5	55.7	4-1/2	M-W	110 W	80	145 U
RL 4133	13776	61.0	31.5	63	35	3	76.1	1.70	11.5	S	67.2	.46	10.6	N	S	58.3	5	57.3	4-1/2	D	105 W	95	135 U
RL 4137	13777	62.0	32.7	62	35	3	76.0	1.73	11.6	S	65.9	.47	10.7	N	S	57.8	5	56.8	4-1/2	D	105 W	95	136 U
RL 4159	13775	59.0	29.6	47	49	4	75.2	1.67	11.7	S	67.4	.47	10.8	N	S	57.0	5	56.0	3-3/4	D	105 W	95	147 U
ND 229-1	13589	60.0	35.8	75	23	2	76.7	1.77	10.7	S	65.2	.45	9.5	N	S	58.3	7	57.3	5-1/4	D	120 W	90	133 U
ND 247	13568	61.5	34.1	71	27	2	76.5	1.78	11.2	S	65.2	.52	10.3	N	Q	59.3	7	58.3	6	D	115	90 I	137 U
ND 256	13608	61.0	38.0	78	19	3	76.8	1.86	12.4	S	63.2	.50	11.4	N	Q	61.0	5	60.0	4	D	105 W	80 O	149 Q
ND 264	13569	61.0	34.6	61	37	2	76.0	1.75	11.6	S	65.6	.45	10.2	N	S	60.3	6	59.3	5-1/4	D	105 W	90 I	144 Q-U
ND 271	13571	60.0	38.3	75	23	2	76.7	1.82	11.2	S	64.9	.45	10.0	N	S	59.7	5	58.7	4-1/4	D	110	95	131 U
ND 287	13590	59.0	38.2	77	21	2	76.8	1.82	11.8	S	62.4	.53	10.7	N	U	60.3	5	59.3	4	D	120 W	90	133 U
ND 345	13653	60.0	35.7	71	25	4	76.2	1.83	12.5	S	65.9	.40	11.4	N	S	61.3	7	60.3	5-1/4	SLD	120 W	95	138 U
ND 404	13778	61.0	36.4	75	24	1	76.7	1.83	11.8	S	65.2	.48	10.7	N	S-Q	59.3	7	58.3	4-3/4	SLD	105 BW	90	132 U
ND 405	13779	57.5	40.3	76	21	3	76.7	1.81	11.9	S	66.4	.43	11.0	N	S	59.0	7	58.0	5	SLD	110	90 OI	150 Q-U
ND 406	13780	61.5	38.8	85	13	2	77.2	1.75	11.4	S	63.8	.37	10.4	N-S	Q	58.7	7	57.7	4-1/2	D	110	90	130 U
II-52-238	13572	60.0	30.5	46	51	3	75.2	1.76	11.4	S	67.2	.46	10.5	N	S	57.2	5	56.2	4	M-W	120 VW	75	142 U
II-53-521	13657	60.5	30.3	51	47	2	75.5	1.84	12.2	S	65.9	.48	11.2	N	Q-S	58.7	6	57.7	4-1/2	M-W	100 W	80	142 U-Q
II-53-525-1	13751	59.0	31.8	55	42	3	75.6	1.84	11.4	S	65.2	.48	10.6	N	Q-S	58.1	5	57.1	4-1/4	M-W	105	80	141 U-Q
II-54-29	13654	61.0	35.5	59	39	2	75.9	1.82	11.1	S	67.7	.41	10.4	N	S	57.5	11	56.5	9-1/2	D	110	60 C	122 U
II-54-30	13655	61.0	33.6	45	52	3	75.1	1.74	11.4	S	67.7	.40	10.4	N	S	57.5	7	56.5	4-1/2	M-W	105	80	142 U
II-55-11	13773	61.0	42.9	82	15	3	77.0	1.76	12.9	VS	67.9	.43	12.0	N	S	60.3	6	59.3	4-1/4	SLD	110 W	90	156 Q
II-55-12	13774	60.5	44.1	84	13	3	77.1	1.78	13.2	VS	68.2	.42	12.1	N	S	60.3	5	59.3	3-3/4	SLD	115 W	90 I	163 Q-S
B61-88	13772	61.0	38.5	71	27	2	76.5	1.75	11.3	S	63.9	.48	10.1	N	Q	58.7	6	57.7	5-1/2	M-W	125 W	75	140 U
B61-95	13586	61.0	34.8	60	38	2	75.9	1.71	10.7	S	64.1	.44	9.8	N	S-Q	56.3	7	55.3	6	D	125 W	80	143 U
Wisc. 6-16-2	13588	59.0	37.7	60	38	2	75.9	1.83	12.4	S	65.6	.47	11.4	N	S	58.3	6	57.3	5-1/2	M-W	120 W	75	154 U

1/ Clean dry - subtract 1#/bu. for dockage free T.W.

2/ 14% moisture basis.

3/ VS - Very Satisfactory, S - Satisfactory, Q - Questionable, U - Unsatisfactory.

4/ N - Normal, H - Hard, S - Soft.

5/ Refer to reference mixogram for numerical curve pattern.

6/ B - Bucky, S - Strong, M - Mellow, W - Weak, D - Dead, Sl - Slightly.

7/ C - Creamy, G - Gray, D - Dull, Sl - Slightly, V - Very, B - Bright, W - White.

8/ O - Open, I - Irregular, S - Soggy, T - Thick wall, Sl - Slightly, C - Close.

TABLE 15

UNIFORM REGIONAL NURSERY SAMPLE AVERAGES

Variety or State Sel. No.	T.W. #/Bu.	1000 Kwt.	Lg.K.	Med.K.	Sm.K.	Pot. Yld.	Wht. Min. 2/	Wht. Pro. 2/	Kern. Char. 3/	Flr. Ext. 2/	Flr. Pro. 2/	Mlg. Char. 4/	Mlg. Per. 3/	Mix. Mix.		Bake Abs. 2/	Bake Time min.	Dough Char. 6/	Crumb Color	Crumb Grain Vol.	Crumb Loaf	Bake Eval. 3/	
														Abs.	Pat.								
			g.	%	%	%	%	%	%	%	%	%	%	%	%	%	%			cc.			
Crim Justin Lee Marquis Pembina	58.5	29.9	39	56	5	74.7	1.72	15.0	S-Q	62.5	47	14.3	N-S	Q-S	64.7	6	63.2	4-3/4	M	110	89	170	Q-S
	58.2	29.0	32	62	6	74.3	1.79	16.3	S-Q	63.3	43	15.5	N	S-Q	65.4	5	63.9	3-1/2	M	106	87	165	Q-S
	58.3	30.1	34	60	6	74.4	1.73	15.4	S-Q	61.5	48	14.7	N-S	Q-U	63.1	4	61.9	3-1/4	M-W	105	95	167	Q-S
	58.8	29.0	28	65	7	74.1	1.77	14.7	Q-S	64.0	46	14.1	N	Q-S	62.3	4	61.2	2-3/4	M	103	89	160	U-Q
	57.1	26.0	16	76	8	73.8	1.76	15.3	Q	62.6	49	14.9	N	Q-U	63.1	6	61.7	4-1/4	M	102	87	173	Q-U
Selkirk Thatcher RL 4133 RL 4137 RL 4159	56.7	29.4	26	64	10	73.8	1.82	15.1	Q	64.8	47	14.7	N	Q-S	63.3	4	61.9	3	M-W	102	90	159	Q-U
	57.8	24.3	16	74	10	73.3	1.75	14.9	Q	63.7	49	14.7	N-S	Q	62.0	4	60.7	3	M-W	103	86	165	Q-U
	59.8	27.4	25	69	6	74.0	1.65	15.4	Q-S	64.8	46	14.9	N	Q-S	63.9	5	62.3	3	M-W	96	89	155	Q
	59.9	27.6	25	69	6	74.0	1.70	15.1	Q-S	64.9	45	14.7	N	Q-S	63.6	5	62.0	3-1/4	M-W	99	87	152	Q-U
	58.8	26.0	19	75	6	73.7	1.72	15.6	Q-S	64.7	46	15.1	N	Q-S	62.6	4	60.7	2-1/2	Q-W	102	88	163	U-Q
ND 229-1 ND 247 ND 256 ND 264 ND 271	58.2	29.8	41	53	6	74.8	1.70	14.6	S-Q	63.3	46	13.8	N-S	Q	63.3	6	61.7	4	M-W	106	93	166	Q
	59.3	28.0	34	60	6	74.4	1.74	15.3	Q-S	62.9	48	14.7	N	Q	65.0	7	63.3	4-3/4	M	114	90	177	S-Q
	58.2	30.5	35	58	7	74.4	1.76	15.5	S-Q	61.1	48	14.6	N-S	Q-U	65.2	5	63.6	3-1/2	M-W	104	87	166	Q-S
	59.4	31.3	35	59	6	74.5	1.72	15.2	S-Q	62.6	46	14.1	N	Q	64.3	5	62.8	3-1/2	M-W	104	96	161	Q
	58.6	33.2	39	56	5	74.7	1.75	14.9	S-Q	61.9	45	14.0	N-S	Q-U	64.5	5	63.1	3-1/2	M-W	107	93	161	Q
ND 287 ND 345 ND 404 ND 405 ND 406	57.7	30.2	50	54	6	74.7	1.81	15.5	S-Q	61.6	51	14.8	N-S	U-Q	64.5	5	62.9	3-1/2	M	105	91	167	Q
	59.6	29.3	30	64	6	74.2	1.65	15.1	Q-S	64.6	41	14.2	N	S-Q	63.7	6	62.1	4	M	108	86	166	Q
	60.1	30.3	39	56	5	74.7	1.71	15.6	S-Q	62.5	46	14.7	N-S	Q	63.5	5	62.0	3-1/4	M-W	114	87	173	Q-U
	58.0	33.8	40	56	4	74.8	1.76	15.4	S-Q	63.6	41	14.8	N	Q-S	64.5	6	62.9	3-3/4	M	104	84	174	Q
	61.4	33.2	50	47	3	75.4	1.66	15.0	S	58.9	39	14.1	S	U-Q	63.7	5	62.2	3	M	103	83	157	Q-U
II-52-238 II-53-521 II-53-525-1 II-54-29 II-54-30	60.0	270	21	72	7	73.7	1.73	15.8	Q-S	65.7	44	15.2	N	Q-S	63.2	4	61.5	2-1/2	M-W	107	82	168	U-Q
	59.7	27.0	24	70	6	73.9	1.75	15.7	Q-S	64.2	45	15.2	N	Q-S	62.7	4	61.1	3	M	104	85	165	Q-U
	57.0	27.6	26	69	5	74.1	1.70	15.5	Q-S	64.0	43	15.1	N	Q-S	63.6	4	62.2	2-3/4	M	110	83	168	U-Q
	61.3	32.3	32	64	4	74.5	1.62	14.6	S-Q	66.4	38	14.2	N	S	62.1	8	60.6	5-1/2	S-M	105	81	162	Q
	61.6	30.4	23	72	5	73.9	1.67	14.5	S-Q	66.8	38	13.9	N	S	61.6	4	60.1	3	M-W	110	82	165	U-Q
II-55-11 II-55-12 B61-88 B61-95 Wisc. 6-16-2	60.9	35.4	46	50	4	75.1	1.69	15.1	S	65.3	42	14.7	N	S-Q	63.7	5	62.3	3-1/2	M-W	106	92	174	Q-S
	60.9	36.0	48	47	5	75.2	1.71	15.3	S	64.7	42	14.7	N	Q-S	63.6	5	62.2	3-1/4	M-W	106	91	173	Q
	58.7	30.5	43	50	7	74.8	1.75	15.3	Q-S	61.4	47	14.7	N-S	Q-U	64.9	5	63.4	4	M	108	88	173	Q
	59.7	30.3	26	69	6	74.0	1.67	14.8	Q-S	61.5	44	14.3	N-S	Q	62.2	5	60.7	3-1/2	M-W	112	87	173	Q-U
	59.7	32.4	29	67	4	76.3	1.78	15.8	S-Q	63.9	47	15.1	N	Q-S	64.5	6	62.9	3-3/4	M	107	91	168	Q-S

1/ Clean Dry - subtract 1#/bu. for dockage free T.W.

2/ 14% Moisture Basis.

3/ VS - Very Satisfactory, S - Satisfactory, Q - Questionable, U - Unsatisfactory

4/ N - Normal, H - Hard, S - Soft.

5/ Refer to reference mixogram for numerical curve pattern.

6/ B - Bucky, S - Strong, M - Mellow, W - Weak, D - Dead.

TABLE 16

AVERAGES

Variety	T.W. 1/ #/Bu.	1000 Kwt. g.	Lg.K. %	Med.K. %	Sm.K. %	Pot. Yld. %	Wht. Min. %	Wht. Pro. %	Flr. Ext. %	Min. @ 65% Ex. %	Flr. Pro. %	Mix. Abs. %	Mix. Pat. %	Bake Abs. %	Mix. Time min.	Dough Char. 4/ %	Crumb Color	Crumb Grain	Loaf Volum cc.
Colorado Station																			
Crim	61.5	34.6	63	45	2	76.1	1.69	14.2	61.9	.45	13.6	64.2	5	63.2	3-1/2	M	100	80	180
Justin	60.5	32.2	55	42	3	75.6	1.76	14.1	65.1	.44	13.6	62.5	3	60.5	2-1/2	M-W	100	95	145
Lee	62.0	35.7	61	38	1	76.0	1.70	14.6	61.9	.45	14.0	62.5	3	61.5	1-3/4	M-W	100	95	162
Pembina	60.0	29.9	31	68	1	74.5	1.70	14.3	64.3	.48	13.8	62.5	5	60.5	4	M	100	100	156
Selkirk	60.0	35.5	55	42	3	75.6	1.76	13.5	65.6	.44	13.0	60.3	2	58.3	2	W	105	90	151
Thatcher	61.5	29.8	39	58	3	74.8	1.67	13.7	62.5	.49	12.9	61.6	3	60.6	2-3/4	M-W	95	90	154
Minnesota Stations																			
Crim	58.8	29.6	36	57	7	74.5	1.73	14.8	63.9	.50	14.2	64.7	6	63.7	4-3/4	S-B	115	95	174
Justin	58.5	30.2	36	57	7	74.5	1.78	17.8	63.7	.43	16.0	65.2	6	63.7	3-1/2	S-M	103	95	184
Lee	58.3	29.9	34	59	7	74.4	1.71	15.8	63.1	.50	14.7	63.2	5	62.7	3-3/4	S-M	100	98	179
Pembina	56.3	25.1	12	77	11	73.1	1.85	15.8	63.4	.525	15.0	63.5	7	62.5	4-1/4	M	105	93	186
Selkirk	55.8	28.1	18	73	9	73.5	1.90	15.5	65.3	.52	15.0	63.5	5	62.5	3-1/2	M	100	100	169
Thatcher	56.8	22.6	7	80	13	72.7	1.85	15.2	65.3	.53	14.5	61.8	4	61.3	3-1/2	M	103	90	174
Montana Stations																			
Crim	58.2	29.3	33	62	5	74.4	1.64	16.0	61.9	.455	15.6	66.2	5	64.4	3-1/4	M-S	113	87	167
Justin	59.3	29.7	26	67	7	74.0	1.69	16.8	64.4	.385	16.4	66.5	4	64.9	2-3/4	M	108	85	159
Lee	59.3	30.3	29	66	5	74.2	1.65	16.6	60.4	.465	16.2	64.4	3	62.6	2-1/4	M-W	100	97	161
Pembina	58.5	26.6	14	78	8	73.3	1.67	16.4	62.8	.455	16.2	65.3	5	63.2	3-1/2	M-S	100	82	172
Selkirk	57.7	30.5	22	71	7	73.7	1.70	16.0	65.8	.435	15.8	64.8	3	62.8	2-1/4	M-W	102	92	156
Thatcher	59.5	37.9	15	76	9	73.3	1.67	16.2	63.8	.45	15.8	63.5	3	61.6	2-1/4	M-W	108	85	162
North Dakota Stations																			
Crim	59.5	29.4	36	61	3	74.7	1.74	15.2	64.2	.415	14.8	64.9	6	63.4	3-1/2	M	103	95	170
Justin	58.3	27.4	21	76	3	73.9	1.84	16.6	62.4	.40	16.4	67.5	7	66.5	3-3/4	M	105	75	163
Lee	59.3	28.7	22	74	4	73.9	1.72	15.2	62.3	.41	14.8	62.8	4	61.8	3-1/4	M	103	95	165
Pembina	56.8	24.7	7	87	6	73.1	1.74	15.5	62.8	.45	15.2	63.2	7	62.2	4-1/2	M-S	100	80	174
Selkirk	57.8	27.4	17	77	6	73.6	1.83	15.3	63.9	.425	15.0	64.1	5	62.9	3-1/4	W-M	100	80	159
Thatcher	57.8	22.5	7	85	8	73.0	1.76	15.1	64.0	.46	14.7	62.8	5	60.9	2-1/2	M	95	75	166
South Dakota Station																			
Crim	51.5	21.6	13	74	13	73.0	1.98	16.9	56.7	.58	14.0	64.2	7	62.2	4-1/2	M	95	95	190
Justin	51.0	20.2	11	76	13	72.9	2.05	17.3	56.3	.56	16.3	66.3	6	64.3	3-1/2	M	100	95	186
Lee	50.0	20.0	5	79	16	72.5	2.04	15.7	57.4	.59	14.9	64.2	7	62.2	4-1/4	M	100	100	193
Pembina	52.0	19.5	3	80	17	72.3	2.02	15.8	57.0	.58	15.1	64.2	8	62.2	3	M	100	100	191
Selkirk	50.0	21.9	10	77	13	72.9	2.06	16.5	59.2	.57	16.2	66.3	5	64.3	2-3/4	W	100	95	175
Thatcher	50.5	16.8	2	76	22	72.0	1.95	15.4	58.0	.60	14.6	63.2	5	61.2	3	M	100	100	184
Wisconsin Station																			
Crim	58.0	36.9	76	22	2	76.7	1.73	11.3	65.2	.45	10.5	60.7	8	59.7	6-1/4	M-W	130	75	143
Justin	59.0	34.0	64	33	3	76.1	1.84	12.7	65.9	.43	11.7	60.3	7	59.3	5-1/2	M-W	120	80	147
Lee	58.0	37.3	76	22	2	76.7	1.73	11.7	63.6	.49	10.6	58.7	6	58.7	5	M-W	120	75	144
Pembina	57.5	31.4	44	53	3	75.1	1.72	11.3	63.6	.51	11.2	55.1	11	55.1	6-1/2	M-W	110	75	143
Selkirk	56.5	33.8	59	38	3	75.8	1.82	10.9	67.2	.48	10.1	56.7	5	56.7	4	M-W	110	80	144
Thatcher	58.5	30.7	52	45	3	75.5	1.69	11.4	66.7	.51	10.1	55.7	5	55.7	4-1/2	M-W	110	80	143
State Averages of the Six Varieties																			
Colorado	60.9	33.0	51	47	2	75.5	1.71	14.1	63.6	.46	13.5	62.3	3.5	60.8	2-3/4		100	92	158
Minnesota	57.4	27.6	24	67	9	73.8	1.80	15.8	64.1	.50	14.9	63.7	5.5	62.7	3-3/4		106	95	171
Montana	58.8	30.7	23	70	7	73.8	1.67	16.3	63.2	.44	16.0	65.1	4.0	63.3	2-3/4		105	88	163
North Dakota	58.3	26.7	18	77	5	73.7	1.77	15.5	63.3	.425	15.2	64.2	5.5	63.0	3-1/2		101	83	164
South Dakota	50.8	20.0	7	73	16	72.6	2.02	16.3	57.4	.58	15.2	64.7	6.5	62.7	3-1/2		99	98	183
Wisconsin	57.9	34.0	62	35	3	76.0	1.76	11.6	65.4	.475	10.7	57.9	7.0	57.5	5-1/4		117	78	143
1963 Average 5/	56.6	27.8	27	65	8	74.0	1.80	15.1	62.7	.485	14.4	63.1	6.4	61.8	3-3/4		106	88	164
1962 Average	58.2	27.6	32	62	6	74.3	1.82	15.0	63.9	.49	14.4	63.4	5	63.3	5		105	92	183

1/ Clean dry - subtract 1#/bu. for dockage free T.W.

2/ 14% moisture basis.

3/ Refer to Reference Mixogram for Numerical Curve Pattern.

4/ B - Bucky, S - Strong, M - Mellow, W - Weak, D - Dead.

5/ Average obtained using data for Minnesota, Montana, North Dakota, South Dakota and Wisconsin.

OBSERVATION NURSERY SAMPLES

Brookings, South Dakota

Variety or State Sel. No.	C. I. No.	T. W. #/Bu.	1000 Kwt.	Lg. K.	Med. K.	Sm. K.	Pot.	Wht. 2/ %	Wht. 3/ %	Pro. Char. 2/ %	Flr. Min. @ 2/ %	Mlg. Char. 3/ %	Mlg. Per. 4/ %	Mix. Abs. 2/ %	Mix. Pat. 2/ %	Bake Mix. Abs. Time 2/ %	Dough Char. 6/ %	Crumb Color 7/ %	Crumb Grain Vol. 8/ cc.	Beke Eval. 3/ %			
Justin Selkirk 11219 11237 11238		50.5	20.2	7	81	12	72.8	2.11	18.1	U	59.7	.40	17.2	N	Q	68.2	5	66.2	2-3/4	M	100 C	70 O	180 Q
		51.0	21.4	6	81	13	72.7	2.08	16.1	Q-U	53.3	.48	14.9	N-S	U	62.5	3	60.5	2-3/4	M	100 C	80SIT	171 Q
		57.5	27.5	9	83	8	73.1	1.93	16.9	Q	54.2	.49	15.7	N-S	U	64.7	2	62.7	1-3/4	M	120 W	70 O	178 U
		59.5	28.2	5	89	6	73.0	2.04	15.8	Q	58.3	.41	13.2	N-S	U	63.5	2	61.5	1-1/2	M	110	70 I	158 U
		60.0	28.1	5	88	7	72.9	2.01	15.5	Q	60.3	.92	12.8	N-S	U	63.2	2	61.2	1-1/2	M	110	70 I	158 U
11239 11241 11274 11275 11295		58.5	26.8	2	88	10	72.6	2.10	16.7	Q	54.9	.46	14.7	S	U	66.3	4	64.3	1-3/4	M	100	95	170 U
		56.5	30.0	14	80	6	73.4	2.02	15.8	Q-S	59.8	.44	14.2	S	U-Q	62.8	2	60.8	1-3/4	M	110	75	164 U
		59.0	29.2	16	79	5	73.6	1.98	15.1	Q	61.8	.43	13.5	S	Q-U	64.4	2	62.4	1-1/2	M	110	70 I	159 U
		59.0	31.1	19	76	5	73.7	1.99	14.6	Q-S	62.1	.42	12.8	S	Q-U	63.2	2	61.2	1-3/4	M	110	80	160 U
		58.0	31.1	32	63	5	74.4	1.90	15.4	S	63.4	.50	14.5	N	Q	64.7	3	62.7	2-1/4	M-W	110	70SIT	158 U
11296 11298 11345 11346 11378		57.5	28.9	25	70	5	74.0	1.90	19.5	S	63.4	.50	13.8	N	Q	64.2	2	62.2	2-1/4	M-W	100	90 SIT	158 Q-U
		57.5	27.5	19	75	6	73.7	2.01	14.9	Q	63.4	.49	14.0	N	Q	63.8	2	61.8	2-3/4	M-W	100	95	164 Q
		60.0	26.9	4	88	8	72.8	2.04	14.7	Q	60.3	.42	13.2	S	Q-U	65.3	3	63.3	2	M	110 W	90 O	168 U
		59.5	26.7	3	88	9	72.7	2.08	15.2	Q	58.8	.45	13.5	S	U	65.7	3	63.7	1-3/4	M	110 W	90 O	171 U
		53.5	22.8	2	80	18	72.2	1.97	15.5	Q-U	62.6	.52	14.6	N	Q-U	65.3	5	63.3	3-1/2	M-S	100	90	174 S
11407 11410 11416 11455 11456		57.5	31.5	15	80	5	73.7	2.07	15.3	Q	65.4	.50	14.5	N	S-Q	65.7	4	63.7	2-1/4	M	105	90 O	182 Q
		58.0	31.1	15	79	6	73.5	2.07	15.1	Q	65.2	.51	14.9	N	Q	64.4	4	62.4	2-1/2	M	110	90 O	177 U
		59.5	29.8	18	75	7	73.6	2.00	14.9	Q	60.8	.44	13.8	S	U	63.2	2	61.2	1-3/4	M	105	95	161 U
		55.5	29.0	14	82	4	73.5	2.06	15.6	Q	64.1	.46	14.9	N-S	U	65.7	3	63.7	1-3/4	VW	100 C	85	149 U
		57.5	30.7	23	72	5	73.9	1.98	15.9	Q	66.9	.44	15.2	N	S	64.4	2	62.4	2	VW	105	80	152 U
11467 11495 11497 11511 11618-4		58.5	26.2	4	88	8	72.8	2.04	15.4	Q	61.1	.37	14.7	S	U-Q	63.8	2	61.8	1-3/4	M	105	80	172 U
		57.5	26.5	9	85	6	73.2	2.05	17.4	Q	56.6	.47	15.4	S	U	64.2	2	62.2	1-3/4	M	105	80	169 U
		59.0	27.6	11	85	4	73.4	2.10	16.6	Q-U	55.0	.39	15.1	S	U	63.5	2	61.5	1-3/4	M	105	80	173 U
		59.0	27.5	4	86	10	72.7	2.06	15.0	Q	52.8	.45	13.8	S	U	65.0	2	64.5	2	W-M	100 C	75	140 U
		58.5	31.2	22	73	5	73.9	2.04	15.7	Q	59.0	.44	14.2	S	U	69.4	2	62.4	1-1/4	M	105	80	164 U
11633-1 11643-1 11644-1 11644-2 11644-3		58.0	24.2	3	86	11	72.6	2.00	15.1	Q	58.1	.42	13.5	S	U	64.2	2	62.2	1-1/2	M	105	80 T	175 U
		57.0	26.8	9	84	7	75.1	2.00	16.4	Q	54.0	.46	14.8	S	U	66.6	3	64.6	1-1/4	M-W	95	80 T	165 U
		58.5	27.7	9	86	5	73.2	1.95	16.9	Q	50.9	.48	15.7	S	U	67.6	3	65.6	1-1/2	M	100	80 T	168 U
		58.5	28.2	11	84	5	73.3	2.05	16.7	Q	50.5	.52	15.3	S	U	67.3	3	65.3	1-1/4	M	105	80 T	163 U
		58.5	28.0	9	86	5	75.2	1.99	16.3	Q	51.6	.49	14.8	S	U	66.3	2	64.3	1-1/4	M	110 C	80 T	163 U
11653-3 11657-2 11670-1 11670-3 11673-4		57.0	28.2	13	80	7	73.3	1.93	19.5	Q	51.4	.46	12.8	S	U	64.7	2	62.2	1-1/4	W-M	105 C	70 T	152 U
		55.0	28.6	20	76	4	73.8	1.99	14.4	Q-U	63.6	.49	13.5	N	Q	64.7	3	62.7	2	M-W	95	80 T	165 U
		58.0	28.5	9	85	6	73.2	2.03	15.3	Q	64.5	.49	14.6	N	Q	57.6	2	65.1	1-1/2	M-W	100	80 T	153 U
		57.5	29.2	13	82	5	73.4	2.06	15.2	Q	62.7	.47	14.7	N	Q	66.6	3	64.1	1-1/4	M-W	100	80 T	153 U
		56.0	26.0	4	88	8	72.8	2.07	16.0	Q	49.8	.52	15.9	S	U	68.5	2	66.0	1-1/4	W	90	70 T	151 U
11682-4 11687-3 11695-2 11695-3 11695-4		56.5	29.0	18	76	6	73.6	1.89	18.3	Q	62.3	.48	15.2	N	Q	65.0	2	63.0	1-1/4	M-W	95	80 T	165 U
		57.5	27.9	15	79	6	73.5	2.09	15.2	Q	55.4	.48	13.6	S	U	63.5	2	61.5	1-3/4	M-W	110	80 T	162 U
		61.0	34.2	31	64	5	74.3	2.00	15.3	S-Q	55.7	.44	13.3	S	U	65.3	2	63.3	1-1/4	M-W	95	80 T	150 U
		60.5	33.1	34	61	5	74.5	2.06	15.7	S-Q	55.7	.44	13.6	S	U	66.0	2	63.5	1-1/4	M-W	90	80 T	143 U
		61.0	34.5	34	62	4	74.5	1.99	15.4	S	54.7	.45	13.4	S	U	65.7	2	63.2	1	M-W	90	80 T	144 U

1/ Clean dry - Subtract 1#/bu. for dockage free T.W.

2/ 14% Moisture Basis

3/ VS - Very Satisfactory, S - Satisfactory, Q - Questionable, U - Unsatisfactory.

4/ N - Normal, H - Hard, S - Soft.

5/ Refer to reference mixogram for numerical curve pattern.

6/ B - Bucky, S - Strong, M - Mellow, W - Weak, D - Dead, SI - Slightly.

7/ C - Creamy, G - Gray, D - Dull, SI - Slightly, V - Very, B - Bright, W - White.

8/ O - Open, I - Irregular, S - Soggy, T - Thick Wall, SI - Slightly, C - Close.

TABLE 18

OBSERVATION NURSERY SAMPLES

South Dakota Samples

Variety or State Sel. No.	C. I. No.	T. W. #/Bu.	1000 Kwt.	Lg. K.	Med. K.	Sm. K.	Pot. Yld.	Wht. Min.	Wht. Pro.	Kern. Char.	Flr. Min. @ Ext. 65% Ex.	Flr. Mlg. Pro.	Mlg. Per.	Mix. Pat. Abs.	Bake Mix. Time	Dough Char.	Crumb Color	Crumb Grain Vol.	Bake Eval.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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1/ Clean dry - subtract 1#/bu. for dockage free T.W.

2/ 14% moisture basis.

3/ VS - Very Satisfactory, S - Satisfactory, Q - Questionable, U - Unsatisfactory.

4/ N - Normal, H - Hard, S - Soft.

5/ Refer to reference mixogram for numerical curve pattern.

6/ B - Bucky, S - Strong, M - Mellow, W - Weak, D - Dead.

7/ C - Creamy, G - Gray, D - Dull, Sl - Slightly, V - Very, B - Bright, W - White.

8/ O - Open, I - Irregular, S - Soggy, T - Thick wall, Sl - Slightly, C - Close.

TABLE 19

SAWFLY YIELD NURSERY

Blend of Outbank and Sidney, Montana

Variety or State Sel. No.	C.I. No.	T.W. #/Bu.	1000 Kwt.	Lg.K. Med.K. Sm.K. Pot. Yld. %	Wht. Min. 2/ %	Wht. Kern. Pro. Char. 3/ %	Flr. Min.@ Ext. 65%Ex. 2/ %	Flr. Mlg. Mlg. Pro. Char. Per. 4/ 3/ %	Mix. Mix. Abs. Pat. 2/ 5/ %	Bake Mix. Abs. Time 2/ %	Dough Char. Color 5/ 7/ 1/	Crumb Loaf Grain Vol. 8/	Bake Eval. 3/	cc.											
Chinook	13220	58.5	23.5	5	85	10	72.8	1.61	16.4	Q	68.2	.37	15.7	N-S	S-Q	67.3	5	66.3	2-3/4	M-S	90	95	885	Q	
Cypress	13344	58.5	22.5	2	88	10	72.6	1.62	16.4	Q	66.8	.36	15.6	N	S	69.1	7	62.1	3-1/2	S	100	85	920	S	
Rescue	12435	56.7	20.6	2	84	14	72.4	1.61	16.2	Q-U	68.1	.37	15.7	N	S	68.5	7	61.5	4	S	100	70	0	1025	S
Sawtana	13304	57.1	20.0	1	83	16	72.3	1.62	17.1	Q-U	69.1	.37	16.7	N	S	67.9	6	60.9	3-3/4	S	100	85	0	1015	Q
Thatcher	10003	56.3	20.3	3	83	14	72.5	1.67	17.0	Q-U	67.3	.38	16.0	N	S	66.6	5	64.1	2-3/4	S	105	95	965	Q	
B60-92	13591	58.4	21.5	1	82	17	72.2	1.67	16.4	Q	68.3	.39	15.5	N	S	68.8	7	65.8	4-3/4	S	90	100	960	S	
60-6	13592	56.5	26.0	8	83	9	73.0	1.61	16.6	Q	70.2	.35	15.9	N	S	66.0	5	62.0	3-1/2	S	105	C	90	935	S
60-7	13593	57.5	26.5	19	73	8	73.6	1.62	17.0	Q	69.6	.36	16.5	N	S	69.4	7	63.9	4-3/4	S	100	C	90	970	S
60-9	13594	58.1	25.9	11	80	9	73.1	1.62	16.7	Q	67.2	.39	15.9	N	S	67.6	5	62.6	4	S	100	70	0	1000	Q-S
60-25	13595	59.0	27.6	20	72	8	73.6	1.52	15.9	Q	68.8	.35	15.5	N	S	68.5	6	62.5	3-3/4	S	100	90	I	1030	S
60-54	13596	58.5	29.5	20	73	7	73.7	1.59	16.3	Q	70.2	.37	15.5	N	S	69.1	6	66.1	5	S-M	105	100	910	S	
5512-641	13597	56.1	24.9	6	88	6	73.0	1.73	17.1	Q	68.4	.37	16.6	N	S	67.9	7	62.9	5-1/2	S	100	80	0	970	S
5130-14	13598	58.9	21.5	1	82	17	72.2	1.68	16.9	Q	66.4	.41	15.6	N	Q	70.3	7	67.3	4-1/4	M-S	90	95	905	S	
B57-211	13617	55.3	19.1	2	82	16	72.3	1.75	16.9	Q-U	66.3	.40	16.1	N	S	69.1	7	57.1	4-1/4	S	95	80	0	1010	S-Q
B61-18	13762	55.7	21.2	1	81	18	72.2	1.77	17.0	Q-U	62.5	.39	16.1	S	U-Q	68.8	6	61.8	5-1/2	S	100	90	0	1025	S

1/ Clean dry - subtract 1#/bu. for dockage free T.W.

2/ 14% Moisture Basis.

3/ VS - Very Satisfactory, S - Satisfactory, Q - Questionable, U - Unsatisfactory.

4/ N - Normal, H - Hard, S - Soft.

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8/ O - Open, I - Irregular, S - Soegy, T - Thick wall, SI - Slightly, C - Close.

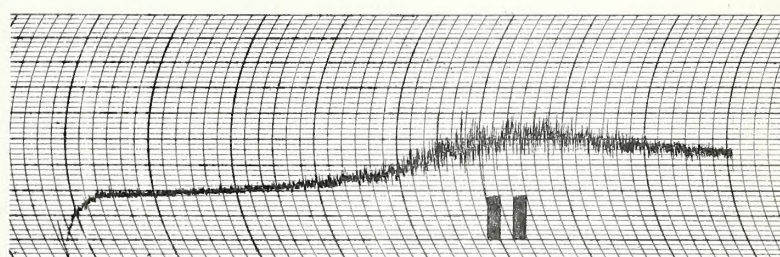
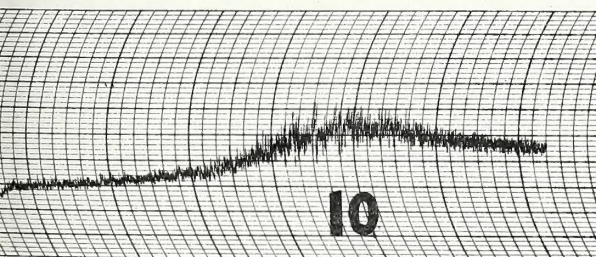
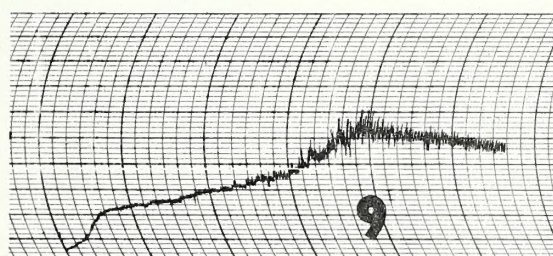
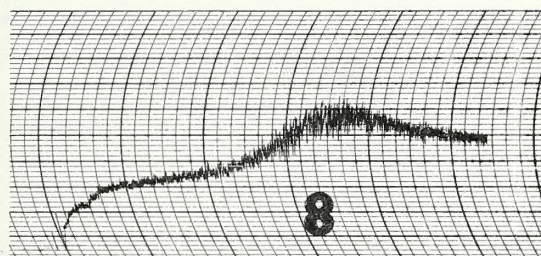
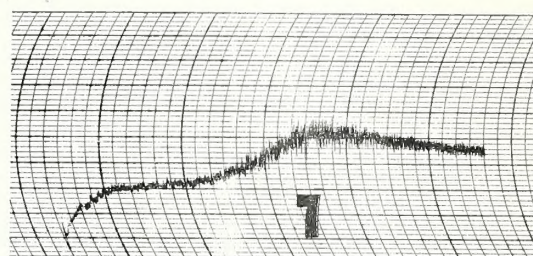
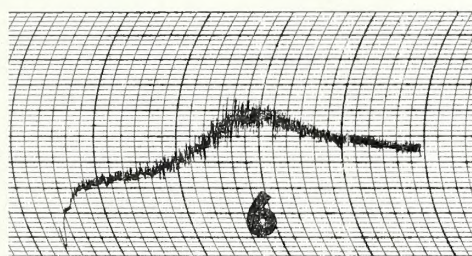
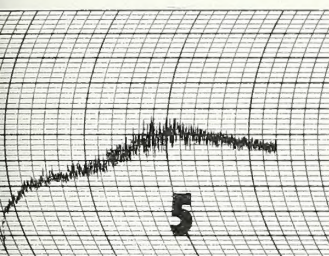
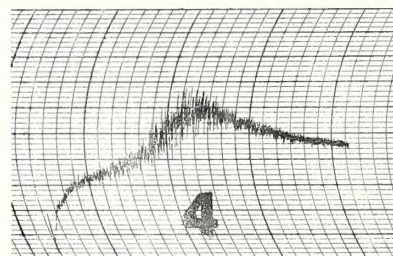
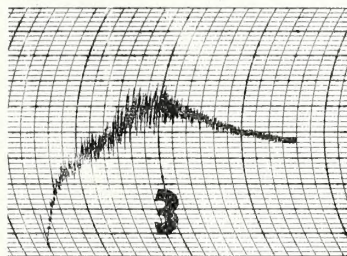
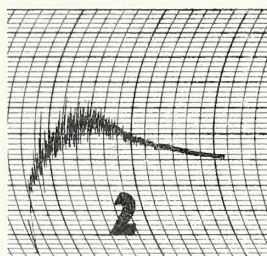
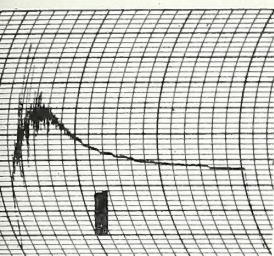
SPECIAL SAMPLES

TABLE 20

Sample	Code	Ext. %	Mixogram Abs. %	Pattern #	Sample	Code	Ext. %	Mixogram Abs. %	Pattern #	Sample	Code	Ext. %	Mixogram Abs. %	Pattern #	
Conley Rushmore	B59-PWI	64.1	65.7	5	75	B59-PWI	58.1	69.4	5	62	B60-PWI	61.5	61.9	4	
	"	63.8	64.7	5	76	"	54.8	67.6	4	63	"	58.7	60.0	5	
	"	60.6	68.2	6	77	"	61.0	69.4	4	Rushmore	B60-PWII	64.8	60.3	5	
	5	58.7	67.0	4	78	"	62.9	67.6	4		CT 186	"	65.4	64.7	5
	9	61.5	69.1	5	80	"	51.9	65.7	3		CT 229	"	62.9	63.5	8
	10														
11	"	58.7	67.0	4	81	"	61.9	67.0	6	CT 254	"	64.4	64.2	4	
12	"	63.2	65.7	5	89	"	58.7	66.3	5	CT 255	"	64.2	64.2	5	
16	"	61.3	65.7	5	91	"	60.4	69.1	6	CT 256	"	65.4	62.8	4	
26	"	44.9	61.6	6	92	"	61.1	65.2	5	CT 427	"	62.1	63.5	6	
27	"	54.3	67.6	6	94	"	58.5	67.6	4	CT 428	"	65.4	62.5	6	
28	"	59.6	67.9	5	97	"	55.8	69.7	5	CT 503	"	64.4	61.0	6	
32	"	59.6	69.7	5	98	"	54.8	69.1	4	CT 513	"	63.8	63.2	8	
37	"	59.0	69.7	6	99	"	60.6	68.5	5	CT 514	"	62.1	62.5	8	
42	"	53.3	66.0	3	100	"	60.0	67.9	4	CT 814	"	62.5	65.3	10	
43	"	63.2	67.9	5	101	"	49.5	67.3	4	674	"	58.7	61.9	5	
44	"	60.2	69.7	5	107	"	59.2	69.7	5	720	"	53.8	62.8	3	
45	"	59.0	65.0	3	110	"	63.2	69.4	5	722	"	61.2	63.2	3	
46	"	56.6	68.2	4	111	"	58.3	68.2	5	726	"	62.9	64.4	5	
48	"	58.7	68.5	4	112	"	60.0	69.7	5	757	"	60.2	61.9	3	
49	"	57.5	67.9	5	Rushmore	B60-PWI	67.0	61.0	6	836	"	65.0	64.2	9	
50	"	60.6	69.4	5	Selkirk	"	65.7	61.3	5	889	"	62.9	64.4	4	
51	"	56.2	69.1	6	18	"	65.7	60.0	4	Lee	B61-PWI	62.9	62.5	5	
59	"	57.7	57.3	5	21	"	66.3	61.3	8	607	"	68.3	61.0	4	
61	"	59.0	69.4	5	32	"	64.4	63.5	4	622	"	50.5	66.3	3	
64	"	57.7	68.8	5	34	"	63.8	63.2	4	667	"	64.4	63.2	5	
65	"	61.3	69.1	5	35	"	58.7	60.0	3	674	"	55.3	59.0	6	
66	"	57.5	69.7	4	36	"	61.5	60.0	4	677	"	63.8	61.9	9	
67	"	58.7	69.7	5	53	"	63.2	65.3	7	686	"	64.8	65.0	4	
68	"	61.3	69.4	5	54	"	61.5	62.8	6	689	"	66.3	61.6	3	
73	"	56.7	67.6	6	55	"	66.0	60.3	4	698	"	61.9	63.8	7	
74	"	56.3	67.9	5	60	"	61.0	61.6	5	701	"	61.9	60.0	5	
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REFERENCE MIXOGRAMS

HARD RED SPRING WHEAT

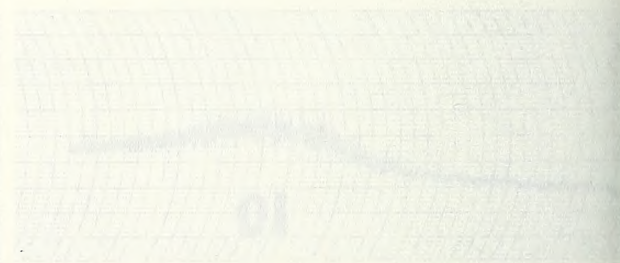
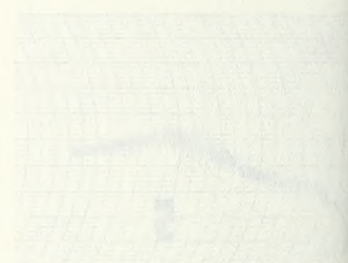
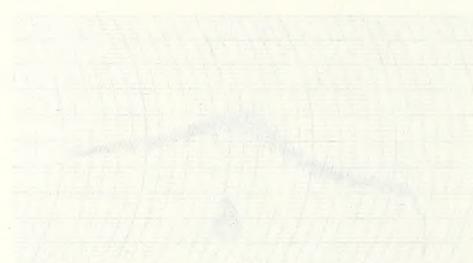


U.S.D.A. SPRING WHEAT QUALITY LABORATORY

FARGO, NORTH DAKOTA

REFERENCE MIXOGRAMS

HARD RED SPRING WHEAT



U.S.D.A. SPRING WHEAT QUALITY LABORATORY

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